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FROM

Prof. Harvey N. Davis

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WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF

PROVISIONAL

Drill and Service Regulations for Field Artillery

(Horse and Light)

1916

VOLUME I

Parts I, II, and III

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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, April 19, 1916.

The following provisional system of Drill and Service Regulations for Field Artillery (Horse and Light), 1916, is approved and herewith published for the information and government of the Regular Army and the Organized Militia of the United States.

By order of the Secretary of War:

H. L. SCOTT,
Major General, Chief of Staff.

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PART I.

GENERAL PRINCIPLES AND DEFINITIONS.

CHAPTER I.—GENERAL PRINCIPLES.

SECTION I.—INSTRUCTIONS.

Object of the Instruction.

1. The reason for the existence of Field Artillery is its ability to assist the other arms, especially the Infantry, upon the field of battle.

The degree to which the Field Artillery prepares itself to render this assistance is, then, the measure of its training. No refinements of drill-ground instruction or other minor details must be allowed to obscure this definite object or to impede progress toward its attainment.

2. To enable it to render effective assistance upon the battlefield artillery must be able, first, to march rapidly and in good order and to establish itself, promptly and without confusion, in such positions as will best utilize the available terrain; second, to deliver an effective and overpowering fire upon any designated part of the enemy's position.

Thorough training in marching, camping, reconnaissance and communication service, fire discipline, conduct of fire and fire direction, carried out over varied country, is essential to the attainment of these qualifications.

3. An additional object of instruction is to develop resourcefulness, initiative, and self-reliance on the part of field artillerymen of all grades.

4. These regulations prescribe a method of training in the ordinary duties pertaining to the service of Field Artillery. The personnel must be so thoroughly drilled that in the excite-

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ment of action the duties will be performed as a matter
second nature.

The regulations also outline general principles according
which Field Artillery is to be handled and fought. A guide
thus furnished as to the best way of dealing with the usual pro
lems which arise. But every problem which arises in servi
has its own best solution, and this solution must be evolv
by the officer on the spot. His success will depend upon the e
tent to which he has prepared himself by previous thoug
and study and by previous practice in the solution of simil
problems.

5. Instruction in peace must therefore be conducted with
view, first, of drilling the personnel thoroughly in their habitu
duties; second, of affording officers and men practice and e
perience in dealing with the situations and difficulties apt
arise in campaign.

6. Each regimental, battalion, and battery commander w
prepare a monthly program of instruction for his unit. In t
preparation of such programs the purpose of all field artille
instruction (1) will be the prime consideration.

In conformity with such programs solutions of practi
problems involving tactical situations with appropriate un
should be required. Practice by officers in making proper d
positions to meet the requirements and developments of tacti
situations is the best training for service in war. Thorou
knowledge of their own arm is not sufficient for officers of Fi
Artillery; they must also know the manner in which the otl
arms march and the tactical principles which guide those ar
in battle.

Officers should be trained to think quickly and logically a
to assume responsibilities unhesitatingly. Errors of judgm
should always be pointed out by the proper commanders; l
such errors should not be criticized harshly, as such critici
causes timidity and consequent inaction, which are gener
more productive of harm than is misdirected zeal.

7. It is made the duty of all Field Artillery commanders
see that instruction is conducted in accordince with the p

ciples and that the means employed are in conformity with the spirit of the regulations, but in the application of the principles to the solution of practical problems the methods prescribed are to be taken as guides only. Great latitude should be allowed in adapting these methods to the peculiar conditions of different cases, and subordinates should be encouraged in every way possible to exercise their skill and ingenuity in solving the problems which present themselves in service.

On the one hand, uniformity of mechanisms and commands is requisite in order that the efficiency of instructed personnel may be uninterrupted, due to the differing opinions of changing unit commanders, and that reserves returning to the ranks may fulfill important duties from the beginning of their renewed service. On the other hand, no progress toward improved methods is possible without study and test of suggested changes and variations.

To secure the objects first mentioned the methods, mechanisms, and commands prescribed herein will be habitually practiced. *To* develop ideas regarding improvements of matériel, ammunition, and methods, officers will be encouraged to investigate, to develop, and to report upon suggestions from any source for the improvement of efficiency, with a view of their adoption by the proper authority. But such investigations will not be permitted to interfere with proficiency in prescribed methods.

Sequence and Methods of Instruction.

8. A progressive order will be followed in all Field Artillery instruction. The annual course of instruction should commence with the smallest unit and proceed to the larger ones in succession, culminating in the field maneuvers.

9. The efficiency of an instructor is measured not only by his knowledge of his subject but by his ability to hold the attention of those whom he is endeavoring to instruct. When the men lose interest and their attention wanders, continuation of the exercise is useless. Hence, short and frequent drills are better than long ones, and effort must be made so to vary the exercises as to avoid monotony.

10. The instructor will always maintain a military bear and, by a quiet, firm demeanor, set a proper example to the m Faults should be corrected gradually, without nagging shouting.

11. Officers and noncommissioned officers of each grade w be frequently practiced in the duties of the next higher gra or command.

12. ***Thorough training of the individual soldier is the basis efficiency. Great precision and attention to detail are essential this instruction in order that the soldier may acquire that habit implicit obedience to orders and of accurate performance of individual duties which is indispensable in combined training.***

If all the individuals of a battery, including the officers, thoroughly trained, a comparatively short period of work formal battery drills, occupation of positions, marches, etc., w the battery as a whole will suffice to produce an efficient orga zation for field service. On the other hand, no amount of d of a battery as a whole is likely to produce an efficient organi tion if its members are not thoroughly instructed as individu

Similarly, comparatively little work of a battalion as a wh is necessary if the batteries and the battalion headquart detail have been thoroughly trained in their individual dut Preliminary battalion instruction may be advantageously c ducted by battalion commanders using only the battalion he quarters detail, the battery commanders, and their details. it must be borne in mind that the battalion is the usual tact unit of Field Artillery, and that its maximum efficiency can secured only by constant exercise of all its parts working conjunction.

13. Instruction of the gun squad as a whole will not be ta up to the exclusion of individual training until the men thoroughly proficient in the nomenclature and operation of those parts of the guns, instruments, and other matériel wh the cannoneers are called upon to handle in actual firing.

Drivers will be thoroughly instructed in equitation before ing up drill with pairs. Similarly, they must understand principles of managing the off horse and be able to handle pair before taking up the team hitched.

14. So far as concerns the enlisted personnel, the most important element of a battery's efficiency on the battle field is its fire discipline. The basis of good fire discipline, as of all other matters, *is thorough individual instruction,* and it can only be secured and maintained by constant and vigorous drills and other exercises. To this end gun squads will be given daily such exercises as will serve to fix their attention and cultivate their dexterity.

Efficient gun squads can not be improvised. The duties of cannoneers and the manual dexterity required for their performance are easily forgotten. So long as there are drivers for the gun sections, each battery must constantly maintain four thoroughly instructed gun squads.

15. During drill hours instruction will be so arranged that either men nor horses will be permitted to remain idle.

16. As soon as practicable after the pieces, caissons, or other Artillery matériel have been used, they will be properly cleaned, kept in order, and inspected by an officer. When stables are held after drill, the gunners and such other men as may be needed will be detailed for the purpose of cleaning and placing the Artillery matériel in proper order, and will clean the same during stables.

17. Both morning and afternoon hours will be utilized for instruction, sufficient time being allowed for the police of barracks, stables, and grounds, and for the care of the personal equipments and effects of the men. All work should normally be done under the immediate direction of noncommissioned officers and under the supervision of officers.

Training of Officers.

18. Responsibility for the training of officers rests upon regimental and battalion commanders.

19. Among the requisites essential in the training of a Field Artillery officer are the following:

Practical understanding of the functions of all parts of the matériel. In addition, battery officers must be able to dismount and to assemble each part of the mechanism without reference to handbooks and without assistance other than the necessary

labor and to perform with skill all the duties required in the qualification of gunners.

Thorough knowledge of horses under the saddle and in draft; how best to ride, control, and manage them in order to conserve their strength; how to train, care for, and condition them in order to secure obedience, handiness, and endurance.

All officers should be familiar with the theory of probability and the laws of error and should be required from time to time to solve problems given them by superior commanders. These problems should be framed to illustrate points of interest and useful application. ***Care should, however, be taken to impress all officers with the fact that theoretical knowledge is of very little value unless they are able to apply it practically.***

Expertness in the reconnaissance, selection, and occupation of positions.

Whenever a position is to be chosen, a definite tactical situation should be stated that will invariably recognize the primary purpose of field artillery to be the assistance of the other arms.

Facility in the observation of fire and the correction of errors: High efficiency can be obtained only by training at service practice, but valuable elementary instruction is possible through the use of subcaliber ammunition, smoke bombs, the terrain board, the blackboard, and simulated fire.

Training of Noncommissioned Officers.

20. Exceptional care and attention will be devoted by battery commanders to the selection and training of candidates for appointment as corporals and of corporals to fit them for duty as sergeants. In each battery a special course of instruction will be given by one of the lieutenants. This course will be considered the equivalent of the course in the noncommissioned officers' school.

21. The corporals and privates selected will be instructed according to a schedule submitted by each battery commander and approved by the regimental commander or by the senior Field Artillery officer present with the command.

22. The course for both selected privates and selected corporals should include such subjects as: Dismounted instruction to include all of Part II—Swimming; Drill in firing commands; The cannoneer; Care of matériel; Equitation; Care and management of horses; The driver; Care of harness and saddlery; Castrametation; First aid; Personal hygiene; Care of clothing and equipment. In addition, the course for selected corporals will include such subjects as: Duties of chiefs of section on the march; in camp; in the firing battery; with respect to discipline and property responsibility.

Training and Inspection of Recruits.

23. All instruction of recruits will be by battery. When it is possible to do so, recruits will be assigned to batteries in detachments of not less than 30 men.

24. Every phase of the instruction of recruits will be under the immediate supervision of an officer. After the recruits have been under instruction a sufficient length of time to enable the battery commander to form an idea as to their capability they will be temporarily divided into classes of cannoneers and drivers. This division will be made permanent prior to the second inspection. In making this division the battery commander will consider the requirements of the service as well as the capabilities of the individual men.

25. Except in active operations or emergencies, recruits will not be placed on rosters for daily duties such as guard, fatigue, police, etc., until they are qualified for permanent assignment to duties in the sections. But such duties as guard, police, etc., will be made subjects of instruction.

26. To determine whether or not the recruits have been properly trained, two inspections will be held by the regimental commander, the battalion commander being present, or by the battalion commander in the absence of the regimental commander. When Artillery brigades are formed, the Artillery brigade commander will, when possible, be present at these inspections.

The first inspection will include the subjects enumerated in paragraph 28. The second inspection will be held for cannoneers and drivers separately and will include the subjects enumerated in paragraph 29.

These inspections should be most thorough and should include everything prescribed by these drill regulations in the subjects enumerated. At the termination of each inspection, or at the end of each day when the inspection requires several days, a detailed critique will be held by the inspecting officer. All officers belonging to the battery whose recruits are being inspected will be present during the inspection and the subsequent critique. By means of this inspection Field Artillery commanders will be able to obtain a very great degree of uniformity in the instruction of the units of their command.

27. The first inspection will take place not less than three months nor more than four months after the recruits have joined the battery on a date to be designated by the regimental commander or senior Artillery officer present with the command.

28. The first inspection will be for all the recruits and will consist of a detailed examination and inspection in the following subjects:

1. Dismounted inspection under arms.
2. Manual of the pistol.
3. Setting up exercises, to include all exercises prescribed in the Manual of Physical Training.
4. Swimming, if facilities are available.
5. Running one-half mile.
6. Customs and courtesies of the service.
7. Dismounted drill, to include the execution of each movement prescribed for the squad and for the battery dismounted.
8. Inspection of barracks or camp, the recruits standing by their beds with their equipment displayed.
9. Inspection of all articles included in the field kit.
10. Packing; rolling the mounted and dismounted blanket roll; rolling the slicker.
11. Shelter-tent pitching.

12. Individual instruction as cannoneers, to include sufficient instruction to enable them to qualify as second-class gunners.

13. Drill of the gun squads in all the exercises preliminary to the service of the piece, to include the execution of each movement described.

14. Care of horses:

(*a*) Questions on the general rules and principles of feeding, watering, care, and grooming of horses.

(*b*) Grooming by detail of one horse by each recruit.

15. Equitation, to include the "Soldier mounted."

16. Care of leather equipment as demonstrated by actually cleaning a saddle and bridle.

17. Fitting a saddle and bridle to a horse.

29. The second inspection will be held not less than five months nor more than six months after the recruits have joined the battery, on a date to be designated by the regimental commander or senior Artillery officer present with the command, and will include:

(A) *For All Recruits.*

1. Dismounted inspection under arms.

2. Setting-up exercises, to include all exercises described in the Manual of Physical Training.

3. Customs and courtesies of the service.

4. Dismounted drill, to include the execution of each movement described for the squad and for the battery dismounted.

5. Guard duty, to determine whether the recruit understands his duties as a sentinel.

6. First aid; Hygiene; Care of the person.

7. Care and use of the pistol, to include the firing of two scores, slow fire, at 25 yards.

8. Pitching, striking, and packing battery tentage.

9. Inspection of clothing and equipment.

10. Individual cooking, to include the preparation of coffee, bacon, and potatoes.

(B) *For Cannoneers Only.*

1. Care, cleaning, and nomenclature of matériel.

2. Rolling cannoneer's rolls and packing them for transportation.

3. Elementary gunnery, to include determining whether the recruits thoroughly understand the principles, mechanisms, methods of fire, etc., given in firing instruction.

4. One battery problem involving the fire of service ammunition by gun squads the principal positions in which are filled by the recruits. If ammunition be not available, or if firing be impracticable, this subject will be replaced by drill in simulated fire.

5. Individual instruction as cannoneers, to include sufficient instruction to enable them to qualify as first-class gunners.

(C) *For Drivers Only.*

1. Nomenclature, cleaning, and fitting of harness.

2. Harnessing and unharnessing.

3. Rolling driver's rolls and packing equipment on the saddle.

4. Handling a single pair at the walk and trot in turns and about; increasing the gait; decreasing the gait; halts; and movements to the front from the halt.

5. Handling a pair in a team hitched, to include the execution at the walk and trot of all movements described in the "Battery mounted."

6. Questions on the care of horses on the march and in camp, with especial reference to shoulders and backs, feeding and watering.

30. If the results of either of these inspections are unsatisfactory, the inspecting officer will require a further period of training at the termination of which another inspection will be held.

Miscellaneous Training.

31. While first place must be given to purely Artillery instruction, the personnel must also be thoroughly trained in all other duties which may be required of Field Artillery. Among

the most important are those incident to the march and the camp. In beginning training in these duties it should be borne in mind that the principal object is instruction, not distance marched. The earlier marches should, therefore, be very short in order that the personnel may be in condition to profit by instruction in the care of animals and matériel, establishing camp, individual cooking, etc. Similarly, instruction in each of the several subjects should be deliberate in the beginning. Painstaking instruction until the men thoroughly understand what they are to do and are accurate in doing it is the only safe foundation upon which to develop speed, which then becomes a matter of practice.

Battery Administration.

32. The administrative duties of a battery of Field Artillery are too numerous for their efficient supervision in detail by one officer. To secure such supervision the battery commander must utilize the services of his lieutenants. The most effective assistance will not be obtained by holding each lieutenant responsible for a platoon, which is not a self-sustaining unit but one dependent upon agencies outside itself.

The assignment of lieutenants to administrative functions must then be made so as to correspond to the various duties necessary to the daily existence of the battery as a whole. These duties may be classified into three departments:

Department A: The care and maintenance of all parts of the wheeled matériel.

Department B: The care of animals, the inspection, care, and issue of forage, the police of stables and picket lines, adjustment and care of harness, shoeing, etc.

Department C: The care and police of quarters, the superintendence of the battery mess, personal equipment and clothing, and the routine office work.

Each of these departments, together with all necessary personnel and matériel, should be under the direct supervision of one of the lieutenants, who should be held responsible for the work of his department. Except in emergencies the battery com-

mander should give instructions affecting any department through the lieutenant in charge.

This division of administrative duties is also utilized to facilitate the instruction of the battery as follows: The lieutenant in charge of department A is the executive, and is placed in immediate charge of the individual instruction of the cannoneers and their duties in the gun squads; the one in charge of department B is placed in immediate charge of the instruction in equitation, in driving, and in all duties pertaining to the horses; and the one in charge of department C is reconnaissance officer and is placed in immediate charge of all dismounted instruction and assists the captain in the training of the battery commander's detail.

The fourth lieutenant, when available, is ordinarily the one with least experience as a battery officer. He should be utilized in assisting the others and should be required to thoroughly familiarize himself with their work.

In time of war the captain assigns his lieutenants to the departments to which they are best fitted, the especial fitness of the executive being the first consideration.

In time of peace, however, in order that the experience of lieutenants in administration and in training men and animals may be complete, their assignment to departments must be periodically changed. To insure this it is desirable that the assignments coincide with the instruction year, during which they should not be changed except when necessary because of changes in the assignment of lieutenants to the battery. A lieutenant will not be assigned to a department in which he has already had experience when it is possible to assign him to one in which he has had no experience or has had it less recently.

SECTION II.—GENERAL RULES.

33. Movements that may be executed toward either flank are explained as toward but one flank, it being necessary to substitute *left* for *right*, or the reverse, to have the command and explanation of the corresponding movement toward the other flank.

34. Any movement may be executed either from the halt or when marching, unless otherwise prescribed.

35. If the movement on foot be from the halt, or when marching in quick time, the command *double time* precedes the command *march;* if marching in double time, the command *double time* is omitted.

36. All mounted movements not specially excepted may be executed at the trot or gallop. The gallop is an exceptional gait for light artillery and should be used only for short distances.

37. The gait should habitually be increased or decreased progressively, the trot being executed from the walk and the gallop from the trot. If marching at the gallop the gait will be decreased to the trot, then to the walk, before halting; if marching at the trot, the same rule applies.

38. To execute a movement at the trot or gallop, the command *trot* or *gallop* precedes the command *march,* unless marching at the gait desired.

39. Movements or procedures explained for the smaller units are, in general, applicable to the larger ones when under instruction of the same character, the commands being modified so as to be adapted to the particular unit.

40. The intervals and distances prescribed in the text are in general such that, if marched by the flank from line, the elements will be in column at proper distances; or if marched by the flank from column, they will be in line at proper intervals. Similarly, if marching obliquely, a second oblique will place the elements in line or column, as the case may be, at proper intervals or distances. If, however, due to differences of length of elements, these conditions do not accurately obtain, the proper intervals or distances are gradually secured by appropriate modifications of the gait.

41. If, in forming elements abreast of each other, the commands: 1. *Battery* (*Platoon,* etc.), 2. *HALT,* be given during the movement, only those elements halt which have reached their new positions; the others continue the march and halt on reaching their positions.

42. For the purpose of correcting errors while marching, the instructor may command: 1. *In place,* 2. *HALT;* when all halt and stand fast. To resume the march, he commands: 1. *Resume,* 2. *MARCH.*

43. To revoke a preparatory command, or, being at a halt, to begin anew a movement improperly begun, the instructor commands: *AS YOU WERE,* at which the movement ceases and the former position is resumed.

44. If a change of formation requires a change of post of officers and noncommissioned officers, they proceed by the shortest routes to their posts in the new formation.

45. While the posts of officers and noncommissioned officers are specified in the text, as instructors they go wherever their presence is necessary.

46. Officers and noncommissioned officers commanding organizations or subdivisions thereof, when absent, are ordinarily replaced by the next in rank in their organization or subdivision.

47. For administrative purposes each unit of Field Artillery has its permanent designation, thus:

The First, Second, Third, Fourth, etc., Regiment of Field Artillery;

The First Battalion, Fifth Regiment of Field Artillery;

Battery D, Sixth Field Artillery;

The first, second, third, etc., platoon of a battery;

The first, second, third, fourth, etc., section of a battery.

For purposes of drill and maneuver, units will be designated by their temporary relative position in line or column, thus:

The right battery, left battalion;

The leading platoon, center battery;

The left section, right platoon.

The permanent numerical designation of units does not change as their relative order in line or column is changed, with the following exception:

After the pieces of a battery are unlimbered and established in line, they are designated from right to left as first piece, second piece, third piece, and fourth piece, or No. 1, No. 2, No. 3, and No. 4.

SECTION III.—COMMANDS.

48. Commands are of two kinds: ***Preparatory commands*** and ***commands of execution.***

The preparatory command, such as ***forward,*** indicates the movement that is to be executed.

The command of execution, such as ***MARCH, HALT,*** causes the execution.

Preparatory commands are distinguished in the text by *italics;* those of execution by ***CAPITALS.***

49. The commands prescribed in the text are given by the instructor, except when otherwise specified.

50. To permit of the preparatory command being understood, a well-defined pause should be made between it and the command of execution. The duration of this pause depends in a measure upon the size of the body of troops under command. Ordinarily, in dismounted movements and in mounted movements executed from a halt, the pause should be brief and of uniform duration, as otherwise uncertainty is communicated to the ranks, and a ragged execution of the movement results.

51. The tone of command is animated, distinct, and of a loudness proportioned to the number of men under command. Indifference in giving commands leads to laxity in execution.

Each preparatory command is pronounced in an ascending tone of voice, but always in such a manner that the command of execution may be more energetic and elevated.

On foot the command of execution is pronounced in a firm, brief tone.

In mounted movements the preparatory commands are more or less prolonged to insure their being heard; the command of execution is always prolonged.

When giving commands to troops it is usually best to face or look toward them.

52. When numbers are announced by voice as part of a command the thousands and hundreds are given separately, but the tens and units are combined thus:

25_____ Twenty-five.
400_____ Four hundred.

705_____ Seven hundred and five.
860_____ Eight hundred and sixty.
3000_____ Three thousand.
3200_____ Three, two hundred.
3250_____ Three, two hundred and fifty.
4050_____ Four thousand and fifty.

53. In transmitting numbers by telephone exact hundreds and thousands are so announced; of other numbers each digit is given separately. Thus—

400_____ Four hundred.
1800_____ One, eight hundred.
3000_____ Three thousand.
3225_____ Three, two, two, five.
4050_____ Four, zero, five, zero.

54. To secure uniformity, officers and noncommissioned officers are practiced in giving commands.

55. The bugle calls and prescribed arm signals are frequently used in instruction, in order that officers and men may readily recognize them.

CHAPTER II.—DEFINITIONS.

56. ***Alignment:*** A straight line upon which several men, teams, carriages, or bodies of troops are formed or are to be formed; or the formation of such line; or the dressing of several elements upon a straight line.

Base: The element on which a movement is regulated or on which a formation is made.

Center: The middle point or element of a command.

Column: A formation in which the elements are placed one behind another.

Conduct of fire: The employment of the technical means necessary to cause fire of the desired nature to be brought to bear upon the target.

Depth: The space from head to rear of any formation, including the leading and rear elements. The depth of a man dismounted is 12 inches.

Disposition: The arrangement of the elements in a formation.

Distance: Open space between elements in the direction of depth.

Element: One of the component parts of a larger unit—as a file, gun squad, team, carriage, section, platoon, battery, etc.

Facing distance: About 14 inches, i. e., the difference between the front of a man in ranks, including his interval, and his depth.

File: Two men—the front-rank man and the corresponding man of the rear rank. The front-rank man is the ***file leader.*** A file which has no rear-rank man is a ***blank file.*** The term file applies also to individual men in single-rank formation. A single mounted man in ranks is also called a file.

File closers: The men who, in dismounted formations, are posted 2 yards in rear of the rear rank in line.

Fire direction: The tactical direction of one or more fire units with a view of bringing their fire to bear at the right place at the right time.

Fire discipline: That condition resulting from training and practice which insures an orderly and efficient working of the personnel in the delivery of fire.

Flank: The right or left of a command in line or column; also the element on the right or left of a line.

By the enemy's ***right (left) flank*** is meant the flank which the enemy himself would so designate.

Formation: Arrangement of the elements of a command in their order in line, in column, or for battle.

Front: The space in width occupied by an element either in line or column. The term ***front*** denotes the direction of the enemy. The front of a man dismounted is 22 inches.

The ***front*** of a gun unlimbered is the direction in which the muzzle points; of a limber or of a carriage limbered, the direction in which the pole points.

Guide: An officer, noncommissioned officer, or private upon whom a command or an element thereof regulates its march.

Head: The leading element of a column, in whatever direction the column is facing.

Interval: Open space between elements abreast of each other.

Laying: The process of pointing a gun for range and direction, so as to cause the trajectory to pass through the target.

Left: The left extremity or element of a body of troops.

Line: A formation in which the different elements are abreast of each other. When the elements are in column the formation is called a ***line of columns.***

Maneuver: A movement executed by a battery or larger unit for the purpose of changing from one formation to another.

Pace: Thirty inches; the length of the full step in quick time.

Rank: A line of men, horses, teams, or carriages abreast of each other.

Right: The right extremity or element of a body of troops.

Salvo: A single discharge from each of the guns of a battery or other unit fired in regular order from one flank to the other, with intervals of about two seconds.

Tail: The rear element of a column, in whatever direction the column is facing.

Volley: The rapid discharge of a certain indicated number of rounds, by each gun of a battery or other unit, each gun firing without regard to the others.

PART II.

DISMOUNTED INSTRUCTION.

CHAPTER I.—GENERAL RULES.

57. Formations are habitually in double rank; the men always fall in at attention.

58. The interval between men in ranks is 4 inches and between ranks in flank column is 30 inches, measured from elbow to elbow. The distance between ranks is 40 inches, measured from the back of the man in front to the breast of the man in rear.

The front of a man is assumed to be 22 inches, or, including the interval, 26 inches; his depth, about 12 inches.

59. To secure uniformity of interval between files when falling in and in the alignments, each man places the palm of the left hand upon the hip, fingers pointing downward, thumb to the front. In falling in, the hand is dropped by the side as soon as the man next on the left has his interval; in the alignments, at the command ***front.***

60. Unless otherwise announced, the guide of a battery or subdivision of a battery in line is ***right.***

In successive formations into line, the guide is toward the point of rest.

To march with the guide other than as prescribed above, or to change the guide: ***Guide right (left).***

The announcement of the guide, when given in connection with a movement, follows the command of execution for that movement.

61. When marching by the flank from line, the leading man of the front rank is, without indication, the guide of the column.

During the oblique march the leading man of the leading rank is, without indication, the guide.

When marching in line, the front-rank man on the designated flank is the guide.

CHAPTER II.—THE SOLDIER DISMOUNTED.

SECTION I.—GENERAL PROVISIONS.

62. This instruction has for its object the training of the individual recruit and afterwards that of the squad. It must be given with the greatest attention to detail.

63. In the instruction of the recruit frequent short rests should be given, in order that the men may not be unduly fatigued.

The instructor will take advantage of these rests to instruct the recruits in the customs and courtesies of the service, the duties of orderlies, the proper manner of receiving messages from and delivering them to officers, etc., so that when the recruit is finally reported for duty he will not only know his prescribed drill thoroughly but will know how to conduct himself out of ranks as a trained soldier.

64. From the beginning the instructor will insist on a smart appearance of the recruits and will require that their clothing be clean and neatly adjusted.

65. The instructor explains briefly each movement, first executing it himself, if practicable. He requires the recruits to take the proper positions unassisted and does not touch them for the purpose of correcting them, except when they are unable to correct themselves. He avoids keeping them too long at the same movement, although each should be understood before passing to another. He exacts by degrees the desired precision and uniformity.

66. In order that all may advance as rapidly as their abilities permit, the recruits are grouped according to proficiency as instruction progresses. Those who lack aptitude and quickness are separated from the others and placed under experienced drillmasters.

SECTION II.—THE RECRUIT.

67. For preliminary instruction a number of recruits, usually not exceeding three or four, are formed as a squad in single rank.

Position of the Soldier, or Attention.

68. Heels on the same line and as near each other as the conformation of the man permits.

Feet turned out equally and forming an angle of about 45°.

Knees straight without stiffness.

Hips level and drawn back slightly; body erect and resting equally on hips; chest lifted and arched; shoulders square and falling equally.

Arms and hands hanging naturally, thumbs along the seams of the trousers.

Head erect and squarely to the front, chin drawn in so that the axis of the head and neck is vertical; eyes straight to the front.

Weight of the body sustained principally upon the balls of the feet, heels resting lightly on the ground. (Pl. 3, par. **136.**)

69. The instructor must insist that the men accustom themselves to the position of attention. It may be so exaggerated that it becomes not only ridculous but positively harmful. Instead of that, the men must be taught to assume a natural and graceful position, one from which all rigidity is eliminated and from which action is possible without first relaxing muscles that have been constrained in an effort to maintain the position of attention. Coordination rather than strength should be depended upon.

The knees are extended easily, but never locked.

The body is inclined forward until the front of the thighs is directly over the base of the toes; the hips are square and the waist is extended by the erection of the entire spine, but not to such a degree that mobility of the waist is lost.

In extending the spine, the chest is naturally arched and the abdomen is drawn in, but not so as to interfere with respira-

tion; the shoulders must not be raised, but are forced back and held loosely in normal position.

The chin should be horizontal.

When properly assumed, a vertical line from the top of the head should pass in front of the ear, the shoulder, and the thigh, through the balls of the feet.

All muscles should be contracted only enough to maintain this position, which at all times should be a lithesome one that makes for activity and that can be maintained for a long period without fatigue.

To Assemble.

70. To teach the recruits to assemble, the instructor requires them to place the palm of the left hand upon the hip, below the belt when worn; he then places them on the same line so that the right arm of each man rests lightly against the elbow of the man next on his right, and then directs the left hand to be replaced by the side.

When the recruits have learned how to take their places, the instructor commands: ***FALL IN.***

They assemble rapidly as above prescribed, each man dropping the left hand as soon as the man next on his left has his interval.

To Dismiss the Recruits.

71. Being in line at a halt: ***DISMISSED.***

The Rests.

72. Being at a halt, the commands are: ***FALL OUT; REST; AT EASE;*** and, 1. ***Parade,*** 2. ***REST.***

At the command ***fall out,*** the men may leave the ranks, but are required to remain in the immediate vicinity. They resume their former places, at attention, at the command ***fall in.***

At the command ***rest*** each man keeps one foot in place, but is not required to preserve silence or immobility.

At the command ***at ease*** each man keeps one foot in place and is required to preserve silence but not immobility.

73. 1. *Parade,* 2. *REST.* Carry the right foot 6 inches straight to the rear, left knee slightly bent; clasp the hands, without constraint, in front of the center of the body, fingers joined, left hand uppermost, left thumb clasped by the thumb and forefinger of the right hand; preserve silence and steadiness of position. (Pl. 1.)

74. To resume the attention: 1. *Squad,* 2. *ATTENTION.* The men take the position of the soldier.

Eyes Right or Left.

75. 1. *Eyes,* 2. *RIGHT (LEFT),* 3. *FRONT.*

At the command *right,* turn the head to the right oblique, eyes fixed on the line of eyes of the men in, or supposed to be in, the same rank. At the command *front,* turn the head and eyes to the front.

Facings.

76. To the flank: 1. *Right (left),* 2. *FACE.*

Raise slightly the left heel and right toe; face to the right, turning on the right heel, assisted by a slight pressure on the ball of the left foot; place the left foot by the side of the right. *Left face* is executed on the left heel in the corresponding manner.

Right (left) half face is executed similarly, facing 45°.

To face in marching and advance, turn on the ball of either foot and step off with the other foot in the new line of direction; to face in marching without gaining ground in the new direction, turn on the ball of either foot and mark time.

77. To the rear: 1. *About,* 2. *FACE.*

Carry the toe of the right foot about a half foot-length to the rear and slightly to the left of the left heel without changing the position of the left foot; face to the rear, turning to the right on the left heel and right toe; place the right heel by the side of the left.

Salute with the Hand.

78. 1. *Hand,* 2. *SALUTE,* 3. *DOWN.*

At *salute* raise the right hand smartly till the tip of the forefinger touches the lower part of the headdress above the right

eye, thumb and fingers extended and joined, palm to the left, forearm inclined at about 45°, hand and wrist straight; at the same time look toward the person saluted. At *down* drop the arm smartly by the side. (Pl. 2.)

Steps and Marchings.

79. All steps and marchings executed from a halt, except right step, begin with the left foot.

80. The length of the full step in quick time is 30 inches, measured from heel to heel, and the cadence is at the rate of 120 steps per minute.

The length of the full step in double time is 36 inches; the cadence is at the rate of 180 steps per minute.

The instructor, when necessary, indicates the cadence of the step by calling *one, two, three, four,* or *left, right,* the instant the left and right foot, respectively, should be planted.

81. All steps and marchings and movements involving march are executed in *quick time* unless the squad be marching in *double time,* or unless *double time* be added to the preparatory command. Example: 1. *Squad right, double time,* 2. *MARCH.*

82. All movements not specially excepted may be executed in double time.

Quick Time and Double Time.

83. Being at a halt, to march forward in quick time: 1. *Forward,* 2. *MARCH.*

At the command *forward,* shift the weight of the body to the right leg, left knee straight.

At the command *march,* move the left foot smartly straight forward 30 inches from the right, sole near the ground, and plant it without shock; next, in like manner, advance the right foot and plant it as above; continue the march. The arms swing naturally.

84. Being at a halt, or in march in quick time, to march in double time: 1. *Double time,* 2. *MARCH.*

If at a halt, at the first command shift the weight of the body to the right leg. At the command *march,* raise the fore-

ms, fingers closed, to a horizontal position along the waist ne; take up an easy run with the step and cadence of double me, allowing a natural swinging motion to the arms.

If marching in quick time, at the command *march*, given as ther foot strikes the ground, take one step in quick time, and ien step off in double time.

85. To resume the quick time: 1. *Quick time*, 2. *MARCH*.

At the command *march*, given as either foot strikes the round, advance and plant the other foot in double time; resume ie quick time, dropping the hands by the sides.

To Mark Time.

86. Being in march: 1. *Mark time*, 2. *MARCH*.

At the command *march*, given as either foot strikes the round, advance and plant the other foot; bring up the foot in rear and continue the cadence by alternately raising each foot about 2 inches and planting it on line with the other.

Being at a halt, at the command *march*, raise and plant the feet as described above.

The Half Step.

87. 1. *Half step*, 2. *MARCH*.

Take steps of 15 inches in quick time, 18 inches in double time.

88. *Forward, half step, halt*, and *mark time* may be executed ne from the other in quick or double time.

To resume the full step from half step or mark time: 1. *rward*, 2. *MARCH*.

Side Step.

9. Being at a halt or mark time: 1. *Right (left) step*, 2. *CH*.

arry and plant the right foot 15 inches to the right; bring left foot beside it and continue the movement in the cadence uick time.

he side step is used for short distances only and is not uted in double time.

Back Step.

90. Being at a halt or mark time: 1. *Backward,* 2. *MARCH.*

Take steps of 15 inches straight to the rear.

The back step is used for short distances only and is not executed in double time.

To Halt.

91. To arrest the march in quick or double time: 1. *Squad,* 2. *HALT.*

At the command *halt,* given as either foot strikes the ground, plant the other foot as in marching; raise and place the first foot by the side of the other. If in double time, drop the hands by the sides.

To March by the Flank.

92. Being in march: 1. *By the right (left) flank,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot, then face to the right in marching (**76**) and step off in the new direction with the right foot.

To March to the Rear.

93. Being in march: 1. *To the rear,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot; turn to the right about on the balls of both feet, and immediately step off with the left foot.

If marching in double time, turn to the right about, taking four steps in place, keeping the cadence, and then step off with the left foot.

Change Step.

94. Being in march: 1. *Change step,* 2. *MARCH.*

At the command *march,* given as the right foot strikes the ground, advance and plant the left foot; plant the toe of the right foot near the heel of the left and step off with the left foot.

The change on the right foot is similarly executed, the command *march* being given as the left foot strikes the ground.

SECTION III.—THE SQUAD.

95. The squad normally consists of a corporal and seven privates.

After the recruits are permanently assigned, each squad assembles as prescribed in The Battery Dismounted.

For the instruction of recruits the men form in squads of eight in double rank (144). For instruction of a part of the battery dismounted the men may similarly be formed as squads without regard to their permanent assignment.

96. The squad executes the *halt, rests, facings, steps,* and *marchings* as explained in the "Recruit."

To Form the Squad.

97. To form the squad the instructor places himself 8 yards in front of and facing the point where the center is to be and commands: *FALL IN.* The men assemble (70) at double time at attention (68). The rear rank forms with a distance of 40 inches. The instructor then commands: *COUNT OFF.*

At this command all except the right file execute *eyes right,* and beginning on the right the files count *one, two, three, four;* each man turns his head and eyes to the front as he counts.

Alignments.

98. To align the squad, the base file or files having been established: 1. *Right (Left),* 2. *DRESS,* 3. *FRONT.*

At the command *dress* all men place the left hand upon the hip, whether dressing to the right or left; each man except the base file, when on or near the new line executes *eyes right,* and, taking steps of 2 or 3 inches, places himself so that his right arm rests lightly against the elbow of the man on his right, and so that his eyes and shoulders are in line with those of the men on his right; the rear-rank men cover in file.

The instructor verifies the alignment of both ranks from the right flank and orders up or back such men as may be in rear, or in advance, of the line; only the men designated move.

At the command *front*, given when the ranks are aligned, each man turns his head and eyes to the front and drops his left hand by his side.

In the first drills the basis of the alignment is established on, or parallel to, the front of the squad; afterwards, in oblique directions.

Whenever the position of the base file or files necessitates a considerable movement by the squad, such movement will be executed by each file marching to the front or oblique, to the flank or backward, as the case may be, without other command.

99. To preserve the alignment when marching: ***GUIDE RIGHT (LEFT).***

The men preserve their intervals from the side of the guide, yielding to pressure from that side and resisting pressure from the opposite direction; they recover intervals, if lost, by gradually opening out or closing in; they recover alignment by slightly lengthening or shortening the step; the rear-rank men cover their file leaders at 40 inches.

To Take Intervals and Distances; to Assemble.

100. Being in line at a halt: 1. ***Take interval***, 2. ***To the right (left)***, 3. ***MARCH***, 4. ***Squad***, 5. ***HALT.***

At the second command the rear-rank men march backward 4 steps and halt; at the command ***march*** all face to the right and the leading man of each rank steps off; the other men step off in succession, each following the preceding man at 4 paces, rear-rank men marching abreast of their file leaders.

At the command ***halt***, given when all have their intervals, all halt and face to the front.

101. In ***taking intervals***, file closers, at the second command, take a distance of 4 paces from the rear rank and, at the command ***march***, face to the flank, each stepping off with the file nearest him.

102. Being at intervals, to assemble the squad: 1. ***Assemble, to the right (left)***, 2. ***MARCH.***

The front-rank man on the right stands fast, the rear-rank man on the right closes to 40 inches. The other men face to the right, close by the shortest line, and face to the front.

103. Being in line at a halt: 1. ***Take distance***, 2. ***MARCH***, 3. ***Squad***, 4. ***HALT.***

At the command ***march*** the man on the right of the front rank moves straight to the front; the other men of the front rank, in order from right to left, and then those of the rear rank, in the same order, move straight to the front, each stepping off so as to follow the preceding man at 4 paces. The command ***halt*** is given when all have their distances.

In case more than one squad is in line, each squad executes the movement. The guide of each rank is right.

If it is desired that a less distance than 4 paces be taken the distance desired may be indicated in the preparatory command. For example: 1. ***Take 8 paces distance.***

104. Being at distances, the men of each squad may be caused to cover the man on the right of its front rank by the command ***cover.***

105. Being at distances, the instructor may command: 1. ***Right (Left)***, 2. ***FACE***, 3. ***COVER.*** The men face in the direction indicated and cover in file.

Before assembling from the resulting formation the instructor commands: 1. ***Left (Right)***, 2. ***FACE.***

106. Being at distances, to assemble: 1. ***Assemble***, 2. ***MARCH.***

The man originally on the right of the front rank stands fast; the others move forward to their positions in line.

If more than one squad is at distances, each squad executes the movement.

To assemble to the rear: 1. ***About***, 2. ***FACE***, 3. ***Assemble***, 4. ***MARCH.***

Executed as above, except that the man originally on the left of the rear rank stands fast.

107. In ***assembling*** file closers conform to the movement and resume their positions in line.

The Oblique March.

108. For the instruction of recruits, the squad being in column or correctly aligned, the instructor causes the squad to face half right or half left, points out to the men their relative positions, and explains that these are to be maintained in the oblique march.

109. 1. ***Right (Left) oblique,*** 2. ***MARCH.***

Each man steps off in a direction 45° to the right of his original front. He preserves his relative position, keeping his shoulders parallel to those of the guide (**61**) and so regulates his steps that the ranks remain parallel to their original front.

At the command ***halt*** the men halt faced to the original front.

Marching at the oblique, to resume the original direction: 1. ***Forward,*** 2. ***MARCH.***

The men half face to the left in marching and then move straight to the front.

If at ***half step*** or ***mark time*** while obliquing, the oblique march is resumed by the commands: 1. ***Oblique,*** 2. ***MARCH.***

To Turn on Moving Pivot.

110. Being in line: 1. ***Right (Left) turn,*** 2. ***MARCH.***

The movement is executed by each rank successively and on the same ground. At the second command the right-flank man of the front rank faces to the right in marching and takes the half step; the other men of the rank oblique to the right until opposite their places in line, then execute a second right oblique and take the half step on arriving abreast of the pivot man. All glance toward the marching flank while at half step and take the full step without command as the last man arrives on the line.

Right (Left) half turn is executed in a similar manner. The pivot man makes a half change of direction to the right and the other men make quarter changes in obliquing.

To Turn on Fixed Pivot.

111. Being in line, to turn and march: 1. ***Squad right (left),*** 2. ***MARCH.***

At the second command the right-flank man in the front rank faces to the right in marching and marks time; the other front-rank men oblique to the right, place themselves abreast of the pivot, and mark time. In the rear rank the third man from the right, followed in column by the second and first, moves straight to the front until in rear of his front-rank man, when all face to the right in marching and mark time; the other number of the rear rank moves straight to the front 4 paces and places himself abreast of the man on his right. Men on the new line glance toward the marching flank while marking time and, as the last man arrives on the line, both ranks execute ***forward, march,*** without command.

112. Being in line, to turn and halt: 1. ***Squad right (left),*** 2. ***MARCH,*** 3. ***Squad,*** 4. ***HALT.***

The third command is given immediately after the second. The turn is executed as prescribed in the preceding paragraph, except that all men on arriving on the new line mark time until the fourth command is given, when all halt. The fourth command should be given as the last man arrives on the line.

113. Being in line, to turn about and march: 1. ***Squad right (left) about,*** 2. ***MARCH.***

At the second command the front rank twice executes ***squad right,*** commencing the second ***squad right*** when the man on the marching flank has arrived abreast of the rank. In the rear rank the third man from the right, followed by the second and first in column, moves straight to the front until on the prolongation of the line to be occupied by the rear rank; changes direction to the right; moves in the new direction until in rear of his front-rank man, when all face to the right in marching, mark time, and glance toward the marching flank. The fourth man marches on the left of the third to his new position; as he arrives on the line, both ranks execute ***forward, march,*** without command.

114. Being in line, to turn about and halt: 1. ***Squad right (left) about,*** 2. ***MARCH,*** 3. ***Squad,*** 4. ***HALT.***

The third command is given immediately after the second. The turn is executed as prescribed in the preceding paragraph, except that all men on arriving on the new line mark time until the fourth command is given, when all halt. The fourth command should be given as the last man arrives on the line.

CHAPTER III.—MANUAL OF THE PISTOL.

115. Both before and after drill or other exercise with the pistol, remove the magazine to see that it is empty, and draw back the slide and examine the bore to see that the pistol is not loaded.

116. The pistol being in the holster, to raise pistol: 1. ***Raise,*** 2. ***PISTOL.***

At the command ***raise,*** unbutton the flap of the holster and grasp the handle with the last three fingers of the right hand, back of the hand to the right. At the command, ***pistol,*** lift the pistol straight up, closing the thumb on the stock as it clears the holster, and extend the forefinger outside of the trigger guard. Carry the pistol forward and upward to a position 6 inches in front of the point of the right shoulder, barrel to the rear and inclined forward about 30 degrees.

117. Being at raise pistol: 1. ***Return,*** 2. ***PISTOL.***

If the pistol is loaded, see that the hammer is down or that the safety lock is in the locking position. Lower the pistol and raise the flap of the holster with the right hand. Insert the pistol in the holster and force it down. Button the flap with the right hand.

118. Being at raise pistol: 1. ***Inspection,*** 2. ***PISTOL.***

Without deranging the position of the hand, rotate the pistol so that the sights move to the left, the barrel pointing to the right front and upward. With the thumb and forefinger of the left hand grasp the slide and pull it toward the body.

If the magazine is empty, as it should be, the slide stop will lock the slide in the open position. Drop the left hand by the

ide. Carry the pistol to a position about 6 inches in front of he center of the body, barrel pointing upward at an angle of bout 45 degrees and to the left, wrist straight and as high as he breast.

When the inspection is completed, resume *raise pistol,* release he slide stop with the left thumb, and lower the hammer by ressing the trigger.

119. The pistol being in the holster: *Prepare for inspection.* At this command the flap of the magazine pocket is unbut-oned and turned back with the left hand. Each man in turn xecutes *raise pistol* and *inspection pistol* in time to be at the itter position as the inspection of the man on his right is com-ienced by the inspector.

As soon as the inspector passes, the soldier completes *inspec-ion pistol,* executes *return pistol,* and with the left hand closes he magazine pocket.

120. Being at raise pistol *to remove the magazine:*

Without deranging the position of the hand, rotate the pistol o that the sights move to the right, the barrel pointing to the eft front and upward; press the magazine catch with the right humb and remove the magazine with the left hand.

121. *To charge the magazine:* Hold the magazine in the left hand, open end up, rounded side to the right. Take the car-ridge in the right hand, thumb on the rim, bullet end pointing o the right; place the rim on the end of the magazine follower; force down the magazine spring and slip the cartridge to the eft into the magazine. The next cartridge is similarly slipped n by placing it on the cartridge just inserted and forcing down the spring.

The magazine may be charged with any number of cartridges from one to seven.

122. The pistol being in the position for removing the maga-zine, *to insert the magazine:*

With the left hand insert the magazine in the handle and shove it home, not by striking it, but with a quick continuous movement, making sure that it engages with the magazine catch. Resume *raise pistol.*

123. Being at *raise pistol* with at least one cartridge in the magazine: *LOAD.*

Rotate the pistol as in *inspection pistol.* With the thumb and forefinger of the left hand grasp the slide, and by pulling it toward the body until fully back and then quickly releasing it cause a cartridge to enter the chamber of the barrel. If the pistol is to be kept in the hand and not fired at once, the safety lock is moved to the locking position with the right thumb. If the loaded pistol is to be carried in the holster the hammer must be fully lowered. Resume *raise pistol.*

124. The pistol being loaded, *to lower the hammer:*

The pistol being in the position for loading, place the left hand around the grip over the right, seat the left thumb firmly on the hammer, and insert the right forefinger inside the trigger guard. Exert sufficient pressure with the left thumb to control the movement of the hammer, press the trigger and the grip safety with the right hand, and carefully and slowly lower the hammer completely down. Remove the forefinger from the trigger.

To again cock the pistol, move the forefinger clear of the trigger, place the right thumb on the hammer, and bring the hammer back to the position of full cock.

125. *To unload: UNLOAD.*

Remove the magazine. Execute the motions of *load,* thereby throwing the cartridge from the chamber.

126. Being at raise pistol, *to fire:* With the right thumb release the safety lock, if in the locking position; extend the arm bring the sights on the target, and press the trigger.

The energy of recoil causes the mechanism of the pistol to eject the empty cartridge case, load, and prepare the pistol for the next shot. Pressure must be entirely relieved from the trigger after each shot in order that the trigger may reengage the sear. At the firing of the last cartridge, as the slide moves to the rear, it is automatically locked in the open position by the slide stop, thus calling attention to the fact that the magazine is empty.

127. *To reload after firing out a magazine:* Remove the empty magazine, insert a charged one, and release the slide stop with the left hand.

128. To exercise the squad in collective firing, either actual or simulated: 1. *At (such an object),* 2. *Ready,* 3. *Squad,* 4. *FIRE.*

At the command *ready,* the pistols are cocked or the safety latches are released. At the command *fire,* each man aims and fires by steadily increasing the pressure of his grip. It is important that no attempt be made to *pull* the trigger.

129. Instruction in firing will conform to the regulations prescribed in the "Small Arms Firing Manual."

130. The physical development of the men will be conducted in accordance with the methods prescribed in the Manual of Physical Training.

CHAPTER IV.—THE BATTERY DISMOUNTED.

SECTION I.—GENERAL PRINCIPLES AND ORGANIZATION.

131. The instruction prescribed for the battery dismounted is applicable, with obvious modification, to the instruction of any number of platoons, sections, or squads dismounted.

132. For technical, tactical, and administrative purposes the enlisted personnel of the battery is assigned to sections. A *section dismounted* consists of one sergeant, who is chief of section, and all the men assigned to the service of a piece and its caisson, called a *gun section;* or to the service of two caissons, called a *caisson section.* The leading caisson of a caisson section is the *first caisson;* the rear caisson, the *second caisson.* The section assigned to the service of the battery wagon and the store wagon and to the service of the tools carried in those wagons is called the *ninth section.* The section assigned to the service of supply is called the *supply section.* At dismounted formations the members of the supply section, unless assigned elsewhere, habitually form in the line of file closers of the ninth section.

133. The first four sections of the battery are *gun sections.* The remaining sections, except the ninth section and the supply

section, are *caisson sections*. Each gun section consists of a *gun squad* and a *driver squad*. Each caisson section consists of a *caisson squad* and a *driver squad*. The ninth section consists of a *mechanic squad* and a *driver squad*.

134. Each *section dismounted* is formed in line, with the gun squad, caisson squad, or mechanic squad on the right, the driver squad on the left. Men temporarily attached to sections fall in in the line of file closers or at such other places as may be designated.

135. Each *gun squad* consists of one of the corporals and seven of the privates assigned to the service of a gun section. The corporal is the *gunner* and should be selected for his qualifications without regard to his rank in the section. The privates are *cannoneers*, numbered from No. 1 to No. 7.

136. Each *caisson squad* consists of one of the corporals and seven of the privates assigned to the service of a caisson section. The corporal is a *caisson corporal*. The privates are *cannoneers*, three of whom are assigned to the first caisson and numbered from No. 4 to No. 6, and the remaining four to the second caisson and numbered from No. 4 to No. 7.

Movements prescribed for a gun squad apply, with obvious modifications, to a caisson, driver, or mechanic squad.

137. Each *driver squad* of the gun and caisson sections consists of a *caisson corporal*, the six drivers of the carriages of the section, and an extra cannoneer, No. 8, who is trained as a spare driver.

138. Each gun squad is formed in double rank as follows: The gunner and Nos. 2, 4, and 6 in the front rank in order from right to left; Nos. 1, 3, 5, and 7 in the rear rank, in order from right to left; No. 1 covering the gunner.

6	4	2	G

40 inches.

7	5	3	1

139. Each caisson squad is formed in double rank as follows: The caisson corporal and Nos. 4, 5, and 6 of the first caisson in the front rank in order from right to left; Nos. 4, 5, 6, and 7 of the second caisson in the rear rank, in order from right to left; No. 4 covering the caisson corporal.

6	5	4	CC

40 inches.

7	6	5	4

140. Each driver squad is formed in double rank as follows: The caisson corporal is on the right of the front rank; the lead, swing, and wheel drivers of the piece in a gun section, or of the first caisson in a caisson section, are on the left of the caisson corporal in order from right to left; the lead, swing, and wheel drivers of the caisson in a gun section, or of the second caisson in a caisson section, are in the rear rank in order from right to left covering the drivers of the front rank; the spare driver, No. 8, is in the rear rank covering the caisson corporal.

W	S	L	CC

40 inches.

W	S	L	8

The driver squad of the ninth section is similarly formed, the spare lead and spare wheel drivers taking, respectively, the places prescribed for the caisson corporal and No. 8.

141. In the fifth section the driver squad is formed with the telephone corporal of the battery commander's detail as its corporal; the scout corporals and the signal privates of that detail fall in as file closers of the section.

142. The mechanic squad is formed in double rank as follows: In the front rank the chief mechanic is on the right and three of the mechanics are on his left; in the rear rank, covering the men in the front rank, are the four remaining mechanics.

143. In a battery on a peace footing the spare cannoneers assigned to the ninth section constitute a squad, which forms on the left of the driver squad.

144. At dismounted formations, if a squad contains less than six men, it is increased to that number by transfers from other squads, or is broken up and its members assigned to other squads and posted in the line of file closers.

When a squad consists of six men, both of the interior files are blank; when of seven men, one such file is blank.

145. A ***platoon dismounted*** consists of one lieutenant, who is ***chief of platoon,*** and two sections dismounted.

The platoon dismounted is formed in double rank, with the sections arranged from right to left in the order of their permanent numbers.

146. A ***battery dismounted*** comprises the personnel shown in detail in Tables of Organization I and II.

147. The battery dismounted is formed in double rank with the platoons arranged from right to left in the order of their permanent numbers.

The senior lieutenant is, at formations and exercises of the battery dismounted, assigned as chief of the first platoon. The lieutenant next in rank is assigned as chief of the second platoon, and so on.

Chiefs of platoon and section supervise the movements of their units.

148. When only a part of the battery is formed for dismounted instruction, the word ***section*** or ***platoon,*** as the case may be, is substituted in the commands for ***battery.***

SECTION II.—POSTS OF OFFICERS, NONCOMMISSIONED OFFICERS, ETC.

In Line.

149. The captain: Four yards in front of the center of the battery.

Chiefs of platoon: Two yards in front of the center of their platoons.

The fourth lieutenant, when there are but three platoons: In the line of file closers, opposite the center of the battery.

The first sergeant: In the front rank, 1 yard from the right of the first section.

The quartermaster sergeant: In the front rank, 1 yard from the left of the left section.

The mess and stable sergeants: In the line of file closers of the ninth section.

Chiefs of section: One yard in front of the center of their sections.

Corporals: The right man of the front rank of their squads, except the scout corporals, who are in the line of file closers of the fifth section.

The guidon and the musicians: In the line of file closers of the first section.

Other men for whom there is no place in the squads: In the line of file closers in rear of the section to which they belong or are attached.

In Column of Squads.

150. The captain: Four yards from the flank, opposite the center, on the left (right) when the first (ninth) section is in front.

Chiefs of platoon: On the same side as the captain, 2 yards from the flank and opposite the center of their platoons.

The fourth lieutenant, when there are but three platoons: On the side opposite the captain, 2 yards from the flank and opposite the center of the column.

The first sergeant: Either 40 inches in front of the guiding file of the leading squad or 40 inches in rear of the guiding file of the rear squad, according as the column has been formed by executing squads right or squads left from line.

The quartermaster sergeant: Either 40 inches in rear of the guiding file of the rear squad or 40 inches in front of the guiding file of the leading squad, according as the column has been formed by executing squads right or squads left from line.

Chiefs of section: On the same side as the captain and 4 inches from the flank man of the front rank of the rear squad of their section.

The file closers: On the side opposite the captain and abreast of and 4 inches from the flank of the squad in rear of which they are posted in line.

SECTION III.—TO FORM AND TO DISMISS THE BATTERY.

151. At the sounding of the ***assembly,*** the first sergeant, facing the battery and 6 yards in front of where the center is to be, commands: 1. ***FALL IN,*** 2. ***CALL ROLLS,*** 3. ***REPORT.***

At the command ***fall in,*** the gunners, caisson corporals, telephone corporal, and chief mechanic place themselves on the line facing to the front in their proper order, at sufficient distance apart for the formation of their squads; each squad forms on its corporal; the chiefs of section take their posts facing their sections. The assembly having ceased, the first sergeant causes the sections to close to the right, if necessary.

At the command ***call rolls,*** the chiefs of section call the rolls and then face to the front.

At the command ***report,*** the chief of the first section salutes and reports: ***First section, present;*** or ***First section, Corporal —— and Private(s) —— are absent.*** The first sergeant, having received and verified this report, returns the salute. The chief of the second section then reports in like manner, and so on. Men who are known to be absent by proper authority are not reported absent by the chiefs of section. After receiving the reports, the first sergeant faces about, salutes the captain, and

reports: ***Sir, the battery is present or accounted for;*** or, ***Sir (so many), noncommissioned officers or privates are absent.*** The first sergeant then takes his post.

The captain places himself 12 yards in front of the center of the battery, superintends the formation, and receives the report of the first sergeant, whose salute he returns.

The lieutenants take their posts as soon as the first sergeant has reported.

During instruction the officers have the saber drawn or in the scabbard, at the discretion of the captain. When the captain draws saber, the lieutenants also draw saber.

To Open Ranks.

152. Being in line at a halt: 1. ***Open ranks,*** 2. ***MARCH,*** 3. ***FRONT.***

At the command ***march*** the front rank executes ***right dress;*** the rear rank and the file closers march backward four steps, halt, and execute ***right dress;*** the fourth lieutenant, when only three platoons are present, marches backward 4 steps and halts; the chiefs of platoon step forward 2 yards, the chiefs of section 1 yard, and all dress to the right. The captain goes to the right flank of the battery and aligns the chiefs of platoons; the chiefs of section, the front rank, the rear rank, and the file closers.

Before giving the command ***front*** the captain places himself in front of the post of the first sergeant and on a line with the chiefs of platoon and faces to the left. At the command ***front*** all the men turn their heads and eyes to the front, and those in ranks drop the left arm.

After the command ***front*** has been executed, the captain places himself 6 yards in front of the center of the battery, facing to the front.

To Close Ranks.

153. Being at open ranks: 1. ***Close ranks,*** 2. ***MARCH.***

At the command ***march,*** the lieutenants and chiefs of section face about and resume their posts in line; the rear rank closes

to 40 inches, each man covering his file leader; the file closers close to 2 yards from the rear rank; the captain then takes his post in line.

Alignments.

154. The alignments are executed as prescribed for the squad; the base squad may, if desired, be established instead of the base file. In aligning the battery, the captain places himself in prolongation of the line, 2 yards from and facing the flank toward which the alignment is made; after commanding *front*, he resumes his post.

To Dismiss the Battery.

155. Being in line at a halt:

The captain directs the first sergeant: *Dismiss the battery*, and returns the salute of the first sergeant.

The officers fall out; the first sergeant salutes, steps 3 yards to the front, faces to the left, and commands: *DISMISSED.*

In exceptional cases the battery may be dismissed from any formation, either at a halt or marching.

SECTION IV.—MANEUVERS OF THE BATTERY.

General Provisions.

156. The maneuvers of the battery dismounted are limited to those necessary for its orderly handling. They are also valuable for fixing the attention of the men and for teaching habits of discipline and prompt obedience.

157. The instruction set forth in detail for the soldier dismounted is applicable to the battery dismounted, the *facings, steps, marchings, turnings, rests*, all being executed according to the same principles, officers, noncommissioned officers, and file closers conforming to the movements.

158. In marching in line the guide is the right or left man of the front rank (**60**). In marching in column of squads the guide is the first sergeant or quartermaster sergeant if in ranks; otherwise the guide of the leading squad.

If the guide is changed while marching in column of squads, the captain, chiefs of platoon, chiefs of section, and file closers change to the other flank by darting through the column or passing around the ends of the column, as may be most convenient.

159. When line is formed from column of squads, the captain, chiefs of platoon and of section, file closers, the first sergeant, and the quartermaster sergeant take their posts in line in the most convenient way without interfering with the movements of the squads.

160. Whenever the battery in line is faced about or marched to the rear, all men in the front rank, not covered, step into the new front rank; the first sergeant and the quartermaster sergeant place themselves in line with the new front rank, but do not change to the opposite flank. The chiefs of platoon and section and the file closers maintain their relative positions.

To Form or March in Column of Squads from Line.

161. Being in line: 1. ***Squads right (left),*** 2. ***MARCH;*** or, 1. ***Squads right (left),*** 2. ***MARCH,*** 3. ***Battery,*** 4. ***HALT.***

Each squad executes the movement (**111**). The chiefs of platoon and of section and the file closers take their places in column of squads (**150**).

The guide of each rank preserves the trace and step of the preceding guide at a distance of 40 inches.

To Change Direction while in Column of Squads.

162. Being in column of squads, to change direction: 1. ***Column right (left),*** 2. ***MARCH.***

At the second command the front rank of the leading squad turns to the right on a moving pivot (**110**); the other ranks, without command, turn successively on the same ground and in a similar manner.

Column half right (half left) is similarly executed.

To Form Column of Squads from Line and Change Direction.

163. Being in line: 1. ***Squads right (left), column right (left),*** 2. ***MARCH;*** or, 1. ***Right (Left) by squads,*** 2. ***MARCH.***

In the first case the right squad initiates the ***column right*** as soon as it has completed the ***squad right.***

In the second case, at the command ***march,*** the right squad marches ***forward;*** the remainder of the battery executes ***squads right*** **(161)**, ***column left*** **(162)** on the same ground as the right squad, and follows the right squad. The right squad in moving off takes four short steps and then the full step.

To Form Line from Column of Squads.

164. Being in column of squads, to form line to the flank: 1. ***Squads right (left),*** 2. ***MARCH,*** 3. ***Guide right (left);*** or, 1. ***Squads right (left),*** 2. ***MARCH,*** 3. ***Battery,*** 4. ***HALT.***

Executed by each squad **(112)**. The chiefs of platoon and section, file closers, etc., take their posts in line **(149)** in the most convenient manner.

165. Being in column of squads, to form line on right or left: 1. ***On right (left) into line,*** 2. ***MARCH,*** 3. ***Battery,*** 4. ***HALT,*** 5. ***FRONT.***

At the first command the corporal of the leading squad commands: ***Right turn.*** The corporals of the other squads command: ***Forward,*** if at a halt. At the second command the leading squad turns to the right on moving pivot. The command ***halt*** is given when the leading squad has advanced the desired distance in the new direction; it halts; its corporal then commands: ***Right (left) dress.***

The squads in rear continue to march straight to the front; each, when opposite the right of its place in line on the left of the preceding squads, executes ***right turn*** at the command of its corporal; each is halted on the line at the command of its corporal, who then commands: ***Right dress.*** All dress on the first squad in line.

If executed in double time, all the squads march in double time until halted.

166. Being in column of squads to form line to the front: 1. *ight (Left) front into line,* 2. *MARCH,* 3. *Battery,* 4. *HALT,* 5. *RONT.*

At the first command the corporals of the squads in rear of he leading one command: *Right oblique.* If at a halt, the cor- oral of the leading squad commands: *Forward.* At the second ommand the leading squad moves straight forward; the rear quads oblique as indicated. The command *halt* is given when he leading squad has advanced the desired distance; it halts; ts corporal then commands: *Left dress.* Each of the rear quads when opposite its place in line resumes the original irection at the command of its corporal; each is halted on the ine at the command of its corporal, who then commands: *Left ress.* All dress on the first squad in line.

If executed in double time, all the squads march in double ime until halted.

To Form Flank Column of Files from Line.

167. Movements in flank column have no disciplinary value. Their use should be limited to the rare occasions necessitating a narrow front of the column. They are executed in quick time only.

168. Being in line at a halt: 1. *Right (Left),* 2. *FACE,* 3. *Forward,* 4. *MARCH.*

At the second command all face to the right. At the fourth command all take the full step. Individuals not in the two ranks move so as to preserve the relative positions they had in line.

Route Order and at Ease.

169. Marching in column of squads: 1. *Route order,* 2. *MARCH;* or, 1. *At ease,* 2. *MARCH.*

Officers carry their sabers at will or in the scabbard; the men retain their positions in ranks, but are not required to keep step.

If the command be *route order,* the men are permitted to talk; if the command be *at ease,* silence is preserved.

To resume the cadenced step: 1. *Battery*, 2. *ATTENTION.*

If the command *halt* be given while marching at route order, the men remain at rest in ranks; if while marching at ease, they remain at ease.

Route order and at ease are not used while marching in double time.

The use of dismounted exercises being limited, the marching of the battery dismounted at route order or at ease should be exceptional.

CHAPTER V.—PRELIMINARY EXERCISES OF THE GUN SQUADS.

SECTION I.—FORMATION OF THE GUN SQUADS.

To Form the Gun Squads.

170. The instructor indicates the place of formation and commands: *FALL IN.*

Each gunner repeats the command and hastens to place himself, faced to the front, where the right of his squad is to rest.

The cannoneers move at double time and take their places.

171. The place of formation is indicated and the command given thus, for example: 1. *In front (rear) of your pieces (caissons);* or, 1. *On the right (left) of your pieces (caissons) facing them;* or, 1. *On the road facing the park,* 2. *FALL IN.*

172. In case the front or rear of the carriages is designated each squad falls in at its post (**175—177**).

173. For the first formation of the gun squads for any drill or exercise the instructor cautions *as gun squads* before giving the command.

To Tell Off the Squads.

174. *CALL OFF.* In each gun squad (**138**) the cannoneer on the right of the rear rank calls off *one;* the cannoneer on the left of the gunner, *two;* the cannoneer on the left of No. 1 *three;* and so on. The gunner does not call off.

In each caisson squad (**139**) the cannoneers of the front rank call off first, thus: *four, five, six,* in order from right to

left, followed by the cannoneers of the rear rank in the same order. The caisson corporal does not call off.

After having called off, if a subsequent formation is ordered, the cannoneers fall in at once in their proper order.

SECTION II.—POSTS OF GUN SQUADS AND CANNONEERS; MOUNTING AND DISMOUNTING.

Posts of the Gun Squads, Carriages Limbered.

175. ***In front of the pieces or caissons:*** Each squad is in line facing to the front, its rear and center 2 yards from the end of the pole or from the heads of the lead horses.

176. ***In rear of the pieces or caissons:*** Each squad is in line facing to the front, its front and center 2 yards from the muzzle or from the rear of the caisson.

177. If no special place of formation is designated, each squad, when formed at the carriages, is posted in front of the leading carriage of its section.

To Post the Gun Squads.

178. The squads are marched to the park, and, on arrival near the carriages, the instructor commands: ***Squads in front (rear) of your pieces (caissons).***

Each gunner marches his squad to its carriage and posts it in the indicated position.

179. The instructor habitually causes the squads to approach the front (rear) of the carriages which he designates in his command, from the right of the park if left in front and from the left if right in front.

Posts of the Cannoneers, Carriages Limbered.

180. The gunner and No. 1 opposite the rear of the limber wheels of the piece.

Nos. 2 and 3 opposite the rear of the gun wheels.

Nos. 4 and 5 opposite the rear of the caisson wheels.
Nos. 6 and 7 opposite the rear of the limber wheels of the caisson.

The gunner and even numbers are on the right, the odd numbers on the left, all 2 feet outside the wheels, facing the front.

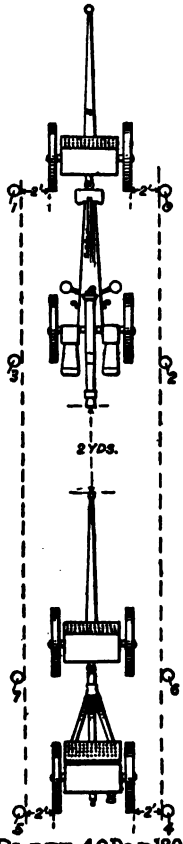

PLATE 40 Par. 180

To Post the Cannoneers.

181. 1. *Cannoneers,* 2. ***POSTS.*** Each gunner repeats the command ***posts.*** The cannoneers leave the ranks, if formed, and move at double time by the shortest practicable routes to their posts.

182. For preliminary instruction the squads, on entering the park, are first posted with their carriages; the cannoneers are then sent to their posts by the foregoing command. The command is general, however, and is applicable when the cannoneers are in or out of ranks, at a halt or marching, and when the carriages are limbered or unlimbered.

To Mount the Cannoneers on the Carriages Limbered.

183. In each squad the gunner and No. 1 mount on the limber chest of the piece.
Nos. 2 and 3 mount on the axle seats.
Nos. 4 and 5 mount on the caisson chest.
Nos. 6 and 7 mount on the limber chest of the caisson.
When extra cannoneers are present:
No. 8 mounts between Nos. 6 and 7.
No. 9 mounts between Nos. 4 and 5.
The gunner and even numbers mount on the right side of their respective carriages, odd numbers on the left.

ft, followed by the cannoneers of the rear rank in the same der. The caisson corporal does not call off.
After having called off, if a subsequent formation is ordered, e cannoneers fall in at once in their proper order.

ECTION II.—POSTS OF GUN SQUADS AND CANNONEERS; MOUNTING AND DISMOUNTING.

Posts of the Gun Squads, Carriages Limbered.

175. ***In front of the pieces or caissons:*** Each squad is in line cing to the front, its rear and center 2 yards from the end of e pole or from the heads of the lead horses.
176. ***In rear of the pieces or caissons:*** Each squad is in line cing to the front, its front and center 2 yards from the muzzle from the rear of the caisson.
177. If no special place of formation is designated, each uad, when formed at the carriages, is posted in front of the ading carriage of its section.

To Post the Gun Squads.

178. The squads are marched to the park, and, on arrival r the carriages, the instructor commands: ***Squads in front r) of your pieces (caissons).***
ch gunner marches his squad to its carriage and posts it in indicated position.
79. The instructor habitually causes the squads to approach ront (rear) of the carriages which he designates in his uad, from the right of the park if left in front and from

Carriages Limbered.

posite the rear of the limber

gun wheels.

No. 1, immediately in rear of the cannoneer's seat, on the right side of the trail of the gun.

No. 2, 2 feet in rear of the gunner, covering him.

Nos. 3, 4, and 5, 2 feet in rear of the caisson chest in the order named from right to left.

Nos. 6 and 7, abreast and in order from right to left, 5 yards in rear of the trail spade.

Higher-numbered cannoneers, if present, accompany the limbers. The cannoneers stand at attention at their posts, facing to the front.

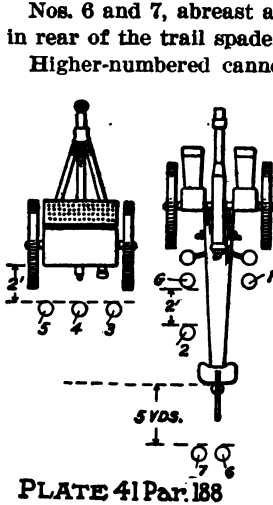

PLATE 41 Par. 188

To Change the Posts of the Cannoneers.

189. In order to exercise the cannoneers in all duties connected with the service of the piece, to vary the drill, and to fix the attention of the men the posts of the cannoneers are frequently changed.

190. The cannoneers being at their posts, carriages limbered or unlimbered: 1. ***Change posts,*** 2. ***MARCH.***

In each squad No. 1 quickly takes the post of No. 2, No. 2 of No. 3, No. 3 of No. 4, No. 4 of No. 5, No. 5 of No. 1. Higher numbered cannoneers change only when specially directed.

SECTION III.—MOVEMENTS OF THE CARRIAGES BY HAND.

To Move by Hand the Carriages Limbered.

191. ***To the front:*** 1. ***Pieces (Caissons) forward,*** 2. ***MARCH,*** 3. ***HALT.*** In each squad, at the first command, the gunner and No. 1 hasten to the end of the pole; Nos. 2 and 3 to the limber wheels; Nos. 4 and 5 to the rear wheels; higher-numbered cannoneers to the rear of the carriage; the gunner and even numbers working on the right side of the carriage, odd numbers on the

left. The cannoneers who work at the pole or at the wheels grasp the same with both hands; those in rear of the carriage prepare to push against the most convenient part of the carriage.

At the command *march*, all assist in moving the carriage to the front. At the command *halt*, the carriage is stopped, the pole is lowered to the ground, and all resume their posts.

192. *To the rear:* 1. *Pieces (Caissons) backward*, 2. *MARCH*, 3. *HALT*. Executed as in the preceding paragraph, except that at the command *march* the cannoneers move the carriage to the rear and that the higher-numbered cannoneers place themselves in front of the rear axle of the carriage and push against the most convenient part of the carriage.

SECTION IV.—DUTIES OF THE CANNONEERS IN UNLIMBERING.

Disposition of the Carriages Before and After Unlimbering.

193. *Before unlimbering:* The piece and its caisson are placed abreast of each other, 2 yards apart, poles pointing in the same direction. This formation of the carriages is called a *double section*. The interval of 2 yards should not be materially changed, otherwise the amount of movement of the carriages by hand is greatly increased.

194. If it is intended to fire to the front, the caissons should be placed on the left of their pieces before the command for unlimbering is given; if it is intended to fire to the rear, the caissons should be on the right of their pieces; if to the flank, on either side of their pieces. In emergencies the carriages may be unlimbered from any formation. Dispositions to meet various situations should be practiced.

195. When not horsed the carriages are drawn by the cannoneers and the instructor gives the necessary instructions for moving the carriages by the shortest routes into the prescribed positions.

196. *After unlimbering:* The adjacent wheels of the gun and caisson are about 1 foot apart, the gun muzzle and the caisson

trail pointing to the front, the gun on the right and slightly in advance of the caisson.

The gun is placed slightly in advance to allow for recoil at the first shot, which on ordinary ground is about 10 inches.

The interval of 1 foot may be increased to permit wide movements of the trail if they are anticipated, but effort should be made to preserve the protection afforded by the shields.

In emergencies the caissons may be placed temporarily on the right of their pieces. As this position is not favorable to the service of ammunition, the caissons should be placed on the left of their pieces as soon as practicable.

197. In active service and in instruction simulating service conditions, the limbers are placed under cover in the vicinity of the position; if no cover is obtainable in the vicinity, they are placed in line in rear of either flank at such place as the instructor may designate.

To Unlimber.

GENERAL RULES.

198. 1. In unlimbering to fire to the front each caisson establishes the position.

2. In unlimbering to fire to the rear, each piece establishes the position.

3. In unlimbering to fire to the flank, the element (gun or caisson) on the side toward which fire is to be directed establishes the position.

4. If the carriages, after unlimbering, have to be moved by hand to the firing position, all the cannoneers of the gun squad when the ground is difficult, assist at each carriage in turn in moving it to the designated position.

5. In drills with the carriages not horsed, spare cannoneers or those higher in number than No. 5 are used to move the limbers to the place designated by the instructor.

6. If the carriages are not horsed, they are unlimbered successively, the one which establishes the position being unlimbered first. The limbers are drawn by cannoneers designated

r the instructor. Thus, if only the gunner and five cannoneers e present, the cannoneers posted with the piece may be required move the limber of the caisson, and those with the caisson, e limber of the piece. If higher-numbered cannoneers are esent, however, they are ordinarily used for this purpose.

To Fire to the Front.

199. The carriages being in double section (**193**) the caisons on the left: ***ACTION FRONT.*** If marching, the carriages alt at the command or signal. The cannoneers, if mounted, dismount after the carriages have halted.

The Caissons: Nos. 4 and 5 jump to the trail handles. Nos. 6 nd 7, if present, run to the right and left caisson wheels, respectively, and stand ready to assist in such movements of the arriage as may be necessary. No. 4 unlatches the pintle; Nos. and 5 raise the trail from the pintle; and No. 4, by raising his rm, signals for the drivers to drive on; Nos. 4 and 5 then lower he trail to the ground. No. 4 sets the brake, and all the cannoneers at the caisson take their posts.

The Pieces: The gunner and No. 1 jump to the trail handles. No. 2 runs around the muzzle of the gun to the wheel that is o become the right wheel of the piece unlimbered and places himself so as to be ready to turn the top of his wheel toward he trail. No. 3 runs around the muzzle of the gun to the wheel that is to become the left wheel of the piece unlimbered and places himself so as to be ready to turn the top of his wheel toward the muzzle. The gunner unlatches the pintle, and, assisted by No. 1, raises the trail from the pintle. The gunner, by raising his arm, signals for the drivers to drive on. The gunner and No. 1 carry the trail away from the caisson and all of the cannoneers working together turn the piece around 180°. The gunner causes the piece to be placed by the side of the caisson (**196**). The gunner and No. 1 lower the trail to the ground, and all the cannoneers at the piece take their posts.

Limbers: At the signal *drive on,* the limbers take their prescribed positions (197). To take posts in rear of the carriages each caisson limber executes a left about, moves straight to the rear, executes another left about, and halts, so that the heads of the lead horses or the end of the pole will be 25 yards from the rear of the caisson. Each piece limber follows the caisson limber, passes around in rear of it, and halts so as to be abreast of it and 2 yards to its right.

In horse batteries, Nos. 6 and 7 do not assist at the caisson.

To Fire to the Rear.

200. The carriages being in double section, the caissons on the right: ***ACTION REAR.*** If marching, the carriages halt at the command or signal. The cannoneers, if mounted, dismount after the carriages have halted.

The Caisson: Nos. 4 and 5 jump to the trail handles. Nos. 6 and 7, if present, run to the right and left caisson wheels, respectively. No. 6 stands ready to turn the top of his wheel away from the trail, while No. 7 stands ready to turn his toward the trail. No. 4 unlatches the pintle; Nos. 4 and 5 raise the trail from the pintle and No. 4, by raising his arm, signals for the drivers to drive on; Nos. 4 and 5 carry the trail away from the piece and all the cannoneers working together turn the caisson around 180° and place it by the side of the piece (196); Nos. 4 and 5 lower the trail to the ground. No. 4 sets the brake and all of the cannoneers working on the caisson take their posts.

The Piece: The gunner and No. 1 jump to the trail handles. No. 2 runs around the muzzle of the gun to the wheel that is to become the right wheel of the piece unlimbered, and stands ready to assist in such movements of the carriage as may be necessary. No. 3 runs around the muzzle of the gun to the wheel that is to become the left wheel of the piece unlimbered, and stands ready to assist in such movements of the carriage as may be necessary. The gunner unlatches the pintle and, assisted by No. 1, raises the trail from the pintle. The gunner, by raising

is arm, signals for the drivers to drive on. The gunner and No. lower the trail to the ground and all the cannoneers at the iece take their posts.

Limbers: To take post in rear of the carriages, each caisson mber inclines well to the right, moves to the rear, executes a ft about, and halts so that the heads of the lead horses or the nd of the pole will be 25 yards from the rear of the caisson. ach piece limber follows the caisson limber, passes around in ear of it, and halts so as to be abreast of it and 2 yards to its ght.

In horse batteries, or when Nos. 6 and 7 are not present, Nos. and 3 perform the duties prescribed for Nos. 6 and 7, respecvely, as soon as the piece trail is lowered to the ground.

To Fire to the Flank.

201. The caisson being on either side of the piece, 2 yards rom and abreast of it: ***ACTION RIGHT (LEFT).***

Executed according to the principles of *action front* and *action ear*, with the following modifications: After the carriages are nlimbered the muzzle of the gun and the trail of the caisson re turned in the direction of fire, and the carriage in rear is un up to its proper position on the line. The carriage on the ide toward which fire is to be delivered is first established in osition, and then all the cannoneers assist in bringing up the arriage in rear to its proper place.

Limbers: To take post in rear of their carriages, the limber farthest from the flank toward which fire is to be delivered move out first, wheel away from the direction of fire, and after having gained sufficient distance to the rear execute an about and halt at the prescribed position. The other limbers follow and take position in a similar manner.

Section V.—Duties of the Cannoneers in Limbering.

202. The carriages being in position unlimbered and in march order, to limber to the front and rear: 1. *Limber,* 2. ***FRONT AND REAR.***

In each squad the gunner and No. 1 face to the rear at their posts. No. 2 places himself on the right of the gunner, facing to the rear. No. 3 jumps across the trail of the piece and places himself on the left of No. 1, facing to the rear. Nos. 4 and 5 hasten to the front of the caisson; No. 4 releases the brake, and both place themselves with their backs toward the chest, close up against the footboards, No. 4 on the right, No. 5 on the left of the trail. No. 6 passes around the right of the piece and places himself on the right of No. 4. No. 7 runs around the left of the caisson and places himself on the left of No. 5.

The limbers are brought up so as to move squarely across the direction of the trails and so that the wheel nearest the trail will pass about a foot outside of the lunette.

When the axle of the piece limber is nearly in line with the trail, the gunner commands: 1. *Limber,* 2. ***HALT.*** The limber halts and is then swung around and again halted so that the pole is pointing in the direction of the trail and so that the pintle is almost over the lunette. As soon as the limber has halted in this position, the gunner and No. 1 spring to the trail handles and raise the trail. Nos. 2 and 3 jump to the gun wheels and prepare to assist in any movements of the carriage that may be necessary. The gunner and No. 1 place the lunette over the pintle; the gunner latches the pintle.

The caisson is limbered in the same manner, No. 4 giving the commands for halting the limber; Nos. 4 and 5 handling the trail; No. 4 latching the pintle; Nos. 6 and 7 assisting by working on the wheels in any movements of the carriage.

All the cannoneers take their posts at the carriages limbered.

203. To the rear: 1. *Limber,* 2. ***REAR.***

No. 4 releases the brake. The caisson is turned around 180°; Nos. 4 and 5 carrying the trail away from the piece. Nos. 1 and 6 turn the top of their wheel toward the trail; Nos. 3 and 7 turn the top of their wheel away from the trail; the gunner and No. 2 assist by pulling and pushing on the chest. The caisson having been turned, all the cannoneers working together run the caisson 20 yards straight to the rear of the line of guns. Nos. 4 and 5 lower the trail and all the cannoneers

take their posts for limbering. The limbers are brought up and the limbering is completed as described in paragraph **202.**

SECTION VI.—TO LEAVE THE PARK.

204. At the conclusion of the instruction in the park the instructor sees that the carriages are properly cared for and then causes the squads to form in front or rear of their carriages. The squads may then be closed by the command: 1. ***Squads right (left),*** 2. ***MARCH,*** 3. ***Close,*** 4. ***MARCH.*** At the last command the leading squad halts and the rear squads close on it in quick time and halt. If executed in double time, the leading squad resumes or continues the quick time at the last command and the other squads take the quick time when they are closed.

Or, the squads may be faced to the right or left. At the command: 1. ***Close,*** 2. ***MARCH,*** the leading squad stands fast and the others close on it.

After forming the squad column the men are marched off.

PART III.

MOUNTED INSTRUCTION.

CHAPTER I.—THE SOLDIER MOUNTED.

SECTION I.—OBJECT AND SEQUENCE OF THE INSTRUCTION.

205. The object of this instruction is the training of the Field Artillery soldier:

(*a*) In equitation and horsemanship.

(*b*) In the care, management, and conditioning of horses.

(*c*) In saddling and unsaddling; in fitting, cleaning, and caring for all the different articles of horse equipment.

In order to give greater variety to, and promote the instruction of recruits, their training mounted will be commenced as soon as they have received elementary instruction dismounted, and the two kinds of training will then be carried forward simultaneously.

206. A systematic and progressive sequence of instruction based upon sound, fundamental principles as laid down in the Manual of Equitation is a matter of the greatest importance. An instructor who does not have clearly defined and correct ideals, who does not understand the results to be attained and the methods to be employed will spoil both men and horses.

Only conscientious efforts and absolute confidence that the methods pursued will produce the desired results will insure success in this training.

The enlisted personnel assisting the instructor must be conversant with the methods, sequence, and goal of instruction.

207. Elementary instruction in equitation and horsemanship is logically divided into three periods, as follows:

1. First period devoted to:

(*a*) Establishing confidence.

(*b*) Suppling the rider to secure independence of movement in hands, body, and legs, and to combat rigidity.

(*c*) Establishing a correct and firm seat independent of the eins.

2. Second period devoted to: Teaching the aids and their correct application in controlling the horse.

3. Third period devoted to: Work on long lines and exercises ver varied ground.

In a program of instruction the limits of these periods can not e clearly defined. Obviously they must overlap to a greater or ss extent. Nevertheless, by assigning principles and ideas to a xed place in point of time, clearness in understanding the heory and practice of equitation is gained. Moreover, such an ssignment directs the efforts of both instructor and pupil upon roper lines and assists them in locating faults and in applying he proper remedies.

208. Concurrently with the instruction covering these periods dvantage should be taken of rests during instruction and of nclement weather, to lecture to, and then question the men on he rules for the care, management, and conditioning of horses; n the principles of saddling, bitting, and shoeing; on fitting, leaning, and caring for equipment; on the points of the horse; n minor ailments and first aid; and on other elementary but seful knowledge connected with horses and stables.

209. The instruction covering these periods should be satisfactorily completed in about 60 lessons of at least one and one-half hours each. While it is not expected that the average man ven with perfect instruction can become a satisfactory horseman in so short a time, due to an insufficient amount of actual ractice, it is expected that he can become so well grounded in the principles of equitation and in the management of horses as to be able to take up and pursue with rapid progress the further instruction outlined under the "Driver." This addi-

tional instruction should, within a further period of three months, bring him up to the standard required (29).

210. The elementary instruction herein outlined is conducted on the snaffle. That involving the use of the double bridle is confined to and made a part of the instruction in advanced equitation.

Instruction in advanced equitation for officers, noncommissioned officers, and selected privates will be under charge of an officer especially selected for his expert ability as a horseman and will be in accordance with the authorized manuals dealing with the subject.

SECTION II.—THE STANDARD REQUIRED.

211. The efficiency of Field Artillery depends so largely on the riding of the men, and on the care, training, management and condition of the horses that the maintenance of a high standard of horsemanship must be in the aim of all commanders.

212. For a Field Artillery officer skill in the actual riding and management of a horse is a most desirable accomplishment to which some are better adapted and in which they become more expert than others, but a thorough understanding of the care, management, and conditioning of horses, the ability to instruct men in equitation and horsemanship, and the ability to train or direct the training of remounts, are essential qualifications.

213. For a Field Artillery soldier the qualifications of a good horseman are as follows:

(*a*) He should have a strong seat, quite independent of the reins.

(*b*) He should be able correctly to apply the aids by which a horse is controlled.

(*c*) He should be capable of covering long distances on horseback with the least possible fatigue to himself and to his horse.

(*d*) Under proper directions, he should be able to train an untrained horse and to improve a badly trained one.

(*e*) He should have a practical knowledge of the care of horses, both in garrison and in the field; he should understand

ow to detect and treat the minor ailments to which they are able; and he should be a good groom.

In addition, if a driver—

(*f*) He should be able to drive a pair of horses in any position in a team and make them do even work in draft without distressing or fretting them.

(*g*) He should thoroughly understand the care and fitting of harness.

SECTION III.—HINTS TO INSTRUCTORS.

214. An instructor in equitation and horsemanship should, preferably, be a practical and expert horseman, one who has a great interest in and a passion for the work. He must endeavor to make his lessons progressive and interesting and must suit his progress to the capacity of his pupils.

All routine in the instruction must be avoided. On frequent occasions new and unexpected but logical and proper requirements should be set by the instructor.

Especially in the beginning must the instructor be careful to match rider and horse according to the aptitude of the former. Later on horsemanship is promoted by gradually increasing the difficulties of the task and by making more frequent changes in the assignment of horses.

The setting-up exercises, as prescribed in the Manual of Physical Training, as well as gymnastic instruction of any kind, are profitably made a part of the daily program of men undergoing riding instruction.

215. Well-trained horses, free from vicious habits and possessing good elastic gaits are absolutely necessary in order to reach the desired standard in the allotted time. These horses should be maintained in excellent condition and worked out daily in sections by good older riders, especially by the assistant instructors, prior to the prospective arrival of recruits.

216. The soldier will be taught that his disposition or temper is usually communicated to and reacts upon the horse, and that it is therefore necessary to preserve patience and calmness. A feature of all instructional work should be its quietness. By

nature a horse is a nervous animal, and shouting or yelling fills him with fear often to the extent of rendering him quite unmanageable. The instructor should always maintain an attitude and bearing that will serve as an example to the men under his charge.

217. The health and personal hygiene of the men must be constantly watched, otherwise accidents and loss of confidence may follow.

Mounted instruction is conducted without hurry, the lesson beginning and ending at a walk. Rests should be frequent, especially with recruits, and exercises and gaits should be changed with sufficient frequency to avoid wearying men and horses. An instructor should be careful not to keep horses reining back, or working on two tracks, or in place, for more than a few minutes at a time. Generally speaking, horses should not be reined back for more than 5 yards nor be worked on two tracks for more than 40 or 50 yards at a time. All work in place must be slow, deliberate, and without noise or exaggerated use of the aids. These exercises should always be followed by movements to the front with the horse straight.

218. The instructor and his assistants have no fixed position. They may be on foot or mounted. For the first lessons it is advantageous to remain on foot, so as better to explain movements and correct faults. Later it is more advantageous to be mounted, for an instructor, in addition to a verbal description, can then give a practical illustration of what is required. A recruit who may have difficulty in learning his work by mere verbal instruction will often quickly do so by copying an expert horseman.

219. Men will be taught that exaggerated movement of any sort is crude and unfinished and that the expert horseman attains his ends with the minimum of exertion to himself and to his horse.

220. Lessons, movements, or explanations which tax the understanding of the average man should always be given individually or in small groups.

All practical work and new exercises should be preceded and ıde clear by actual demonstration, either mounted or dis-ɔunted or on the wooden horse.

During the execution of a movement or exercise the in-ructor avoids general remarks, and in the correction of faults : addresses by name those committing them.

The instructor must frequently question his pupils to satisfy lmself that his instructions are thoroughly comprehended. uring periods of rest or when at a halt or moving at the slower ıits he mingles with the men, and, by questions and explana-ons addressed to individuals, he endeavors to impress upon em the principles embodied and to awaken their interest.

During the riding instruction proper only short, clear, and itchy phrases which will appeal to the intelligence of the men ıould be used. Lengthy explanations should be made either efore or after the instruction hour, with the riders gathered bout the instructor.

221. During the early instruction greater progress will be ıade and better results accomplished by work in the riding all or outdoor riding court, because the horses go more quietly, he nervousness natural to beginners is greatly lessened, and here is nothing to distract the attention of men and horses. When weather permits the outdoor riding court is preferable o the riding hall.

Where a riding hall or riding court is not available, as in a ıamp or the field, the work may be conducted in an outdoor ectangle, the corners of which are marked by elevated and conspicuous objects, constructed of such material as not to injure a horse or rider that collides with them. Such a rect-ıngle is of sufficient dimensions (*316*) to enable the riders to exercise with freedom while remaining under the eye of the instructor and within reach of his voice. The instructor changes the ground as soon as the tracks are worn to the extent that the horses follow them mechanically. He avoids placing his rectangle parallel to adjacent rectangles, roads, paths, or

fences, so that from the first the rider is compelled to direct his horse.

The riding hall, open court, and outdoor rectangle are re ferred to in these regulations as the *riding school.*

In early lessons the men lead their horses to the school an return them to the stable in the same manner. When the have received sufficient instruction they go and return mounted

As soon as the riders have acquired sufficient confidence i their seat and their ability to stay on a horse riding on a rectangle of extended dimensions and short road marches shoul be undertaken.

222. In the later period of instruction road marches an cross-country riding should be undertaken, gradually increasin the requirements and difficulties. In the beginning they shou take place once and during the last period at least twice p week. During these outdoor exercises riding in long lines, wi extended and irregular intervals over broken ground, is th most productive of good results, because it teaches both rid and horse self-reliance, confidence, and initiative. The sectio should be frequently broken up and the riders sent home o to some designated rendezvous by pairs over different routes.

During the more advanced training out of doors every occasi should be utilized to instruct the men in the care and saving o the horse, the proper tempo or cadence of the different gaits, an their use, depending upon the nature of the ground, as well a elementary instruction in orientation, scouting, carrying me sages, making reports, etc.

223. An instructor can handle to best advantage a sectio of about 12 to 15 men. Instruction becomes imperfect and unsatisfactory when the number exceeds 30.

224. A lesson period for the riding school should not exceed 2½ hours, divided as follows:

Forming on the battery parade, marching to stables or picket line, saddling, bridling, leading out, and reporting mounted and formed at the riding school—20 minutes.

Actual work under the eye of the instructor—1 hour 30 minutes.

Returning to the stable or picket line, unsaddling, unbridling, aring for equipment, grooming, watering, leading in and marching to the battery parade for dismissal—40 minutes.

The time of the actual work in the riding school should never e reduced to less than 1 hour; for road marches and cross-ountry riding the minimum should be 2 hours. All men should e impressed with the fact that the proper time to care for horses nd equipment is immediately after their use.

SECTION IV.—PRELIMINARY INSTRUCTION.

Horse Equipment.

225. The instructor indicates the different articles of horse quipment, instructs the men in the nomenclature of the various arts, as given in the Handbook, and explains the uses of these arts.

To Fold the Blanket.

226. The blanket, after being well shaken, will be folded nto six thicknesses, as follows: Hold it well up by two adjacent orners, the longer edges vertical; double it lengthwise, so the old will come between the "U" and "S," the folded corner in the left hand; take the folded corner between the thumb and forefinger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulders, the blanket extended between them; bring the hands together, the double fold falling outward; pass the folded corner from the right hand into the left hand, between the thumb and forefinger, slip the second finger of the right hand between the folds, seize the double folded corner; turn the left, disengaged corner in and seize it with the thumb and forefinger of the right hand, the second finger of the right hand stretching and evening the folds; after evening the folds, grasp the corners and shake the blanket well in order to smooth the folds; raise the blanket and hold the upper edge between the chin and breast; slip the hands down halfway, the first two fingers out-

to the off side, cross the right stirrup, then the cincha over the saddle; pass to the near side, cross the cincha strap over the saddle; grasp the pommel with the left hand, the cantle with the right, remove the saddle over the croup and place it in front or in the rear of the horse as may be directed, pommel to the front; if in the stable, place the saddle on its peg; grasp the blanket at the withers with the left hand and at the loin with the right; remove it in the direction of the croup, the edges falling together, wet side in, and place it across the saddle, folded edge on the pommel.

Fitting the Saddle.

230. Great care must be taken in the fitting and adjustment of saddles, to prevent sore backs.

There are six axioms in saddle fitting:

1. The withers must not be ***pinched*** nor ***pressed*** upon.

2. The central line of the back must have no pressure put upon it.

3. The shoulder blades must have full and unhampered movement.

4. The loins must not carry weight.

5. The weight must be put upon the ribs through the medium of the muscles covering them.

6. The weight must be ***evenly distributed*** over a surface which extends from the play of the shoulders to the last true rib.

To fit the saddle: (*a*) The saddle, without blanket, is placed in its proper position on the back. It is noted whether the upper or lower edges or the front or rear of the side bars gouge into the back at any place. If this occurs or if the saddle when lifted from the back a distance corresponding to the thickness of the blanket otherwise fails perceptibly to conform to the outlines of the back, the test and remedy described under (*c*) should be made and applied.

(*b*) The existence of wither pressure is determined by blanketing and saddling the horse and placing an assistant in the saddle. The hand is run over the top and along both sides of the withers

anket is smooth; return to the near side, run the left hand, ck up, down the withers so as to raise the blanket slightly der the pommel arch, in order that the withers may not be ched or pressed upon; take the cincha strap in the right hand, ach under the horse and seize the cincha ring with the left nd, pass the end of the strap between the ring and safe and rough the ring, then up through the upper ring from the itside; if necessary, make another fold in the same manner.

The strap is fastened as follows: Pass the end through the per ring to the front; seize it with the left hand, place the gers of the right hand between the outside folds of the strap; ll slowly from the horse with the right hand and take up the ack with the left; cross the strap over the folds, pass the end it, with the right hand, underneath and through the upper g back to the folds, then down and under the loop that crosses e folds and draw it tightly; secure the end of the strap.

Another method of fastening the cincha strap is as follows: ass the end through the upper ring to the rear; seize it with the ght hand, place the fingers of the left between the outer folds the strap; pull slowly from the horse with the left hand d take up the slack with the right; pass the end of the strap derneath and draw it through the upper ring until a loop is rmed; double the loose end of the strap and push it through e loop and draw the loop taut. The free end should then be ng enough conveniently to seize with the hand.

Having fastened the cincha strap, let down the right stirrup, en the left.

The surcingle, if used, is then buckled over the saddle, and hould be a little looser than the cincha.

In saddling a horse the cincha must be tightened gradually, nd not with violence, a practice that if persisted in renders a orse ill tempered and mean in saddling.

To Remove the Saddle.

229. ***UNSADDLE:*** Stand on the near side of the horse; unuckle and remove the surcingle; cross the left stirrup over the addle; loosen the cincha strap and let down the cincha; pass

these pieces of felt are to rest they are attached to the side bar with glue and bound in place by sheepskin tacked to the sid bars. The most radical alterations in the fit of the side bars ca in this manner be affected. The method is simple and quic and can easily be performed by the average battery saddler.

(*f*) The cincha should be sufficiently tight to keep the sadd in its place and no tighter. Generally speaking, correct cinc ing has been obtained when the flat of the hand is easily a mitted under the quarter ring safe. With most horses, aft exercising for a while, the cincha will be found too loose, a should be taken up.

A tight cincha restricts the animal's breathing and also brin too much pressure upon and strangles the tissues. Especial is this apt to be the case under the quarter and cincha ri safes, where strangulation soon causes lumps, puffs, and sores.

(*g*) Care is taken that the quarter straps are so adjusted a the cincha so selected that the cincha ring safe will be a suf cient distance from the quarter ring safe to avoid pinching a galling the skin between them.

To Put On the Double Bridle.

231. ***BRIDLE:*** Take the double reins in the right hand, t crownpiece in the left; approach the horse on the near side; sli the reins over his head, letting them rest on his neck; take t crownpiece in the right hand and the lower left branch of t curb bit in the left, the forefinger against the mouthpiece; bri the crownpiece in front of and slightly below its proper positio insert the left thumb into the left side of the mouth above t tush; press upon the lower jaw, insert both bits by raising t crownpiece, then with the left hand draw the ears gently unde the crownpiece, beginning with the left ear; arrange the fore lock, secure the throat latch and the curb chain, taking care to adjust them properly.

The bridle with snaffle bit only, used on team horses, is put on in a similar manner.

A bridle with curb bit only is not permitted to be used on the horses of individually mounted men, because the curb when used

one is a powerful instrument requiring such dexterity in its use at only an expert horseman on a perfectly trained horse is pable of using it with sufficient delicacy and discretion to tain perfect control without injuring the horse.

A horse quickly resents and is easily frightened by abrupt or idden movement about his head. Bridling should therefore be one in a most deliberate and careful manner. The ears are pecially sensitive, and extreme care must be used in drawing em under the crownpiece and into their place. A reliable test at a horse has not been mistreated in bridling is that he per- its, without sign of fear or resentment, the gentle stroking of s ears.

232. Except in the field, or when equipped for field service, when the duty is such as to make it necessary to tie up a horse, e halter is taken off before bridling, the reins being first assed over the neck.

If the halter is not taken off, the halter strap is tied in the ear pommel ring, or, if the horse be not saddled, around his eck. When the halter is to remain on, care should be taken at the halter rope is untied from the manger before attempt- g to bridle a horse that is liable to pull back.

To Fit the Snaffle Bridle.

233. (*a*) The cheek straps are adjusted so that they are of ven length and so that the snaffle rests easily in, ***but does not*** ***raw up*** the corners of the mouth. A mouthpiece that is too ow strikes the tushes and makes them sore; one that is too igh causes the horse discomfort and makes the corners of his nouth sore.

(*b*) The browband is examined. If it is too short, it causes he sensitive skin at the base and back of the ears to be galled r cut by the crownpiece. If it is too high on the crownpiece, it auses the same trouble at the base and sides of the ears.

(*c*) The throatlatch is buckled loosely, being only sufficiently ight to prevent the crownpiece from slipping over the horse's ars. Generally speaking, it should permit the entire flat of the

hand to be inserted between it and the throat when the horse's head is reined in. A tight throatlatch interferes with the large blood vessels of the neck, with the gullet, and also with the wind pipe.

(*d*) The mane and forelock are carefully smoothed out under the crownpiece to avoid causing a sore at the poll and also to present a neat and tidy appearance.

To Fit the Double Bridle.

234. (*a*) The snaffle is fitted as described in the preceding paragraph.

(*b*) A curb bit is selected with a mouthpiece of such length that the branches bear easily against the horse's lips. A narrow bit pinches the lips, while a wide one works about and bruises the lips and the bars. The mouthpiece is best examined for width by inspecting it from the underside of the lower jaw.

(*c*) The cheek straps are adjusted so that the mouthpiece of the bit rests as near as possible opposite the chin groove, but touching neither the tushes nor the corners of the mouth. Generally speaking, the bit should rest about 1 inch above the tushes of horses and about 2 inches above the corner teeth of mares. It rides below the snaffle.

(*d*) The curb chain is fastened outside and below the snaffle. It must be twisted to the right until it lies flat, and it should rest in the chin groove opposite the mouthpiece of the bit. If not properly adjusted, it will have a tendency to ride up and press upon the sharp bones of the lower jaw. The curb chain should be loose enough to admit the flat of two fingers between it and the chin groove when the branches of the bit are in line with the cheek straps. When brought to bear the branches of the curb bit should make an angle of about 45° with the line of the horse's mouth.

(*e*) The throatlatch and brow band are fitted as directed in paragraph 233.

To Remove the Bridle.

235. ***UNBRIDLE:*** Unbuckle the throatlatch. Grasp the middle of the reins with the crownpiece in the right hand. Take

ld of the bit or bits with the left hand. Carefully and gently ip the crownpiece over the ears, at the same time steadying the ts with the left hand so they will not roughly strike against the shes or teeth. Straighten the reins out together and fold them 'er the crownpiece. Hang the bridle on its peg.

To Stand to Heel.

236. *STAND TO HEEL:* Each man stands at attention 1 yard rear of and facing his heel post. At the picket line he is 1 rd in rear of and facing his horse.

To Stand to Horse.

237. *STAND TO HORSE:* Each man places himself, facing to e front, on the near side of his horse, eyes on a line with the ont of the horse's head, so that he can see along the front, and kes the position of attention, except that the right hand, back ppermost, grasps both reins, forefinger between them, about inches from the bit. The reins are on the horse's neck.

The left and right sides of the horse, facing to his front, are lled the ***near*** and ***off*** sides, respectively.

To Lead Out.

238. The men being at stand to horse in the stable or at the cket line, and the horses equipped with snaffle bridles, the structor indicates the place of formation and commands: ***EAD OUT.***

Each man, holding his hand well up and firm, leads his horse, thout looking at him, to the place designated by the instructor. the horse shows a disposition to rush or to resist being led, e soldier takes the snaffle reins from the horse's neck, takes e end of the reins in the left hand and with the right hand lding the reins near the bit leads the horse as before. When ading through a low or narrow doorway, the horse should be ieted by the voice or caresses and not allowed to pass through rriedly. To prevent the horse from rushing through a narrow oorway the instructor may direct the soldier to face toward the

horse, holding one rein in each hand close to the bit, and lead him by stepping backward; after passing the doorway the soldier leads the horse as before.

Upon arriving at the place designated for the formation, the instructor disposes the men upon a line at intervals of one horse length, men at ***stand to horse*** and horses correctly disposed and perpendicular to the line of men.

A horse is correctly disposed when he stands squarely on all four feet, having his head, neck, and body in line.

Alignments.

239. The men being in line at a halt at stand to horse, the instructor sees that the men on the flank toward which the alignment is to be made are in the desired position and commands: 1. ***Right (Left),*** 2. ***DRESS,*** 3. ***FRONT.*** Executed as in The Soldier Dismounted, except that the left hand is not placed on the hip, and each man moves his horse forward or backward as may be necessary, to align him. The instructor may place himself on either flank and give a general alignment by ordering individual men to move their horses backward or forward.

To Mount.

240. ***With saddle.***—The soldier being at stand to horse: 1. ***Prepare to mount,*** 2. ***MOUNT.*** At the command ***prepare to mount*** face to the right, take a step to the right to be opposite the shoulder of the horse; at the same time seize the end of the reins in the right hand and pull them taut enough to give a gentle, even bearing on the horse's mouth; cross the reins flat on the crest and grasp them with the left hand, which also holds a lock of the mane. Place the left foot in the stirrup, assisted by the right hand if necessary, bring the left knee against the saddle, and place the right hand upon the cantle.

At the command ***MOUNT*** rise by an effort of the right leg aided by the arms, the left knee bent and pressed against the saddle, the upper part of the body inclined slightly forward to prevent the saddle from turning; bring the right foot by the side

f the left. Change the right hand to the pommel, pass the ight leg, knee bent, over the croup without touching it, and sit lown lightly in the saddle. Put the right foot in the stirrup, ssisted by the right hand if necessary; take the reins as here-ıfter prescribed.

The instructor takes care that the rider in adjusting the reins ›rovokes no movement and deranges in no manner the position ıf the horse's head.

The instructor cautions the rider to avoid touching the horse ıith the left toe in mounting. This fault begets nearly all the esistance of the horse to standing quietly while being mounted.

241. ***Without saddle.***—Similarly executed (240) except that he right hand is placed on the back near the withers. At the ommand ***mount,*** the soldier springs upward and forward, bear-ng the weight upon the hands and wrists. He remains for a noment in this position, then throws the right leg, knee bent, ›ver the croup without touching it and sits down lightly on the ›orse's back.

242. ***With saddle having stirrups crossed or detached.***—Exe-:uted as prescribed for mounting without saddle, except that the right hand is placed on the pommel of the saddle.

243. ***To mount from the off side.***—Executed as in mounting from the near side but by inverse means.

244. If the command be ***mount*** the men execute all that has been prescribed for ***prepare to mount*** and ***mount.***

To Dismount.

245. ***With saddle.***—1. ***Prepare to dismount,*** 2. ***DISMOUNT.*** At the command ***prepare to dismount,*** pass the right rein into the left hand and grasp with this hand a lock of the mane; remove the right foot from the stirrup and place the right hand on the pommel.

At the command ***dismount,*** rise upon the left stirrup, pass the right leg, knee bent, over the croup without touching the horse, and bring the right foot by the side of the left, the left knee against the saddle, the upper part of the body inclined slightly forward. Descend lightly to the ground and take the position of ***stand to horse.***

246. ***Without saddle.***—Similarly executed (**245**) except that the right hand is placed on the back near the withers. At the command ***dismount,*** rise upon the hands and wrists; pass the right leg, bent, over the croup without touching it, carry it to the side of the left; remain a moment in this position and come lightly to the ground, the heels joined, the knees bent. Take the position of ***stand to horse.***

With saddle having stirrups crossed or detached.—Executed as prescribed for dismounting without saddle, except that the right hand is placed on the pommel of the saddle.

247. ***To dismount on the off side.***—1. ***To the right.*** 2. ***Prepare to dismount.*** 3. ***DISMOUNT.*** Executed as in dismounting from the near side but by inverse means.

248. The men are frequently practiced in mounting and dismounting on the off side.

249. If the command be ***dismount,*** the men execute all that has been prescribed for ***prepare to dismount*** and ***dismount.***

Holding the Reins.

250. ***In both hands.***—The snaffle reins are held one in each hand, the rein coming into the hand under the little finger and passing out over the second joint of the forefinger, on which the thumb, slightly bent, presses and holds it. The bight of the reins falls to the front and right. The reins bearing equally should be so held that the rider feels lightly the horse's mouth, the forearms horizontal, angle between arm and forearm approximating 90°; elbows slightly to the rear, with the fleshy part of the forearm resting lightly against the body; the hands closed, backs outward and vertical; wrist and back of hand straight and in continuation of the forearm; hands approximately 9 inches apart and carried about one hand's breadth above the withers.

The double bridle reins are held two in each hand, as explained for the single reins above, except that the bit rein comes into the hand above the little finger, which separates the two reins.

In one hand.—The snaffle reins are held as explained for two hands, except that the right (left) rein comes into the left (right) hand above the little finger, which separate the two reins.

In the left hand the double bridle reins are held as explained for both hands, except that the right reins come into the hand, one on each side of the second finger, the snaffle rein uppermost, all four reins being pressed upon the second joint of the forefinger by the thumb.

In the right hand they are so held that there is one rein above each finger, left snaffle rein uppermost, and that four reins come out under the little finger.

To Take the Reins in One Hand.

251. 1. *In left (right) hand,* 2. *TAKE REINS.*

The snaffle reins.—Place the left hand opposite the middle of the body and place in it the right rein, holding the reins as explained **(250)**.

The double reins.—Place the left hand opposite the middle of the body; turn the right wrist to the left until the back is up; carry the right hand to the left and insert the second finger of the left hand between the right reins, holding the reins as explained for the left hand **(250)**.

To take the reins in the right hand they are first taken in the left as just described. Then turn the left hand back up and insert the extended fingers of the right hand between the reins so that there will be one rein above each finger, holding them as explained for the right hand **(250)**.

To Retake the Reins in Both Hands.

252. The reins being in the left (right) hand: 1. *In both hands.* 2. *TAKE REINS.* Grasp the right rein with the right hand and hold both reins as heretofore prescribed.

To Adjust the Reins.

253. *The reins being in both hands.*—To shorten the reins the rider brings the wrists together and grasps with one hand above

and near the opposite thumb, the rein that he desires to shorten. To lengthen the reins, the rider permits them to slip through his hands until the proper bearing is secured.

The reins being in one hand.—To lengthen or shorten the reins the rider holds the bight with the hand that was free, while the other one slides along the reins to secure the proper bearing.

To Drop and Retake the Reins.

254. The instructor causes the reins to be dropped and retaken at the commands ***DROP REINS*** and ***RETAKE REINS.***

At the first command the rider drops the reins behind the pommel or on the horse's neck near the withers and lets the hands fall by the side. It will frequently be advantageous to knot the reins before dropping them on the horse's neck.

The Stirrups.

255. The stirrups are properly adjusted when, the rider being properly seated and the legs falling naturally, the tread of the stirrup is about 1 inch and a half above the top of the heel of the shoe.

The stirrups should bear only the weight of the leg; about one-third of the foot should be inserted in the stirrup, so that the ball of the foot rests on the tread, the heel lower than the toe.

The toe is inserted in the stirrup so as to cause the flat of the stirrup strap to rest against the leg.

Placing too much weight on the stirrup disturbs the seat and contracts the leg, hindering its freedom of action.

If the toe is not inserted far enough the rider risks losing his stirrup; if inserted too far suppleness is diminished.

For the extended gallop, for the use of weapons, and for leaping obstacles the foot is inserted fully in the stirrup.

The instructor teaches the soldier how to adjust his stirrups by using his arm to measure the proper length of strap.

Position of the Soldier Mounted.

256. The position described below should be considered a standard toward which all riders should gradually approxi-

te.

The buttocks bearing equally upon the saddle and as far forard as possible.

The thighs turned without constraint upon their flat side, asping the horse evenly and stretched only by their own eight and that of the lower legs.

The knees bent and flexible.

The lower legs falling naturally, the calves in contact with the orse without pressure; the toes dropping naturally when the ider is without stirrups.

The back supple and never hollowed.

The upper part of the body easy, free, and erect.

The shoulders thrown back evenly.

The arms free, the elbows falling naturally.

The head erect without stiffness.

Eyes alert and sweeping the horizon.

The reins held as heretofore prescribed.

This position may be modified by the instructor to suit varying onditions and unusual conformations.

257. The body and the lower legs are movable and should e under the control of the rider, acting intermittently as aids or guiding the horse or as a means of combatting his resistance.

The thigh, on the other hand, should remain fixed immovaly to the saddle except while posting at the trot. This ixity should be obtained, not by the pressure of the knees, ut by the clinging of the buttocks, which is secured by the uppleness of the loins and the relaxation of the thighs.

If the buttocks are too far back, the rider is unable to conform to the movements of the horse and carries forward the pper part of the body. This defect is remedied by sitting well forward in the dip of the saddle.

If the thigh is too nearly horizontal, the rider is doubled up and his power of action diminished; if the thigh is too nearly vertical, the rider is on the crotch and lacks ease.

To sum up: The rider should take a sitting position with the thighs inclined downward.

The various defects of position are overcome by suitable suppling exercises.

The Rests.

258. Being at stand to horse, the commands are: ***AT EASE*** and ***REST,*** which are executed as prescribed in The Soldier Dismounted, except that each soldier retains his hold of the rein to keep his horse in place.

Being mounted and at a halt, the commands are: ***AT EASE*** and ***REST;*** if marching, ***ROUTE ORDER.*** At the command *at ease* the soldier may turn his head and make slight changes of position, but preserves silence.

At the command *rest* or *route order,* the soldier may turn his head, may talk, and make slight changes of position, but must not lounge on his horse.

To resume the attention: 1. *Squad,* 2. ***ATTENTION.*** The soldier, if dismounted, takes the position of stand to horse; if mounted, he takes the position of the soldier mounted.

To Dismiss the Squad.

259. The squad being in line at stand to horse: 1. ***By the right (left, or right and left),*** 2. ***FALL OUT.***

The man on the right leads his horse 1 yard to the front and then directly to the stable or picket line. Each of the other men executes in succession the same movement so as to follow the horse next on the right at a distance of 1 yard.

Being in column of files or twos, at the command ***FALL OUT*** the leading rider or the rider on the right of each two leads out as prescribed and is followed by the other riders in turn.

The men remove, clean, and put the equipments in place, and care for and secure their horses under the direction of the instructor.

The instructor, having satisfied himself by inspection that the horses and equipments are properly cared for, and that the precautions required for the care of horses on their return from exercise have been observed, orders that the men be fallen in, marched to the battery parade, and dismissed.

ECTION V.—ELEMENTARY TRAINING IN EQUITATION AND HORSEMANSHIP, FIRST PERIOD.

1. Establishing Confidence.

260. The first object to be attained in elementary instruction in equitation is to establish the confidence of the rider. Many recruits, especially those who have never before had any experience with horses, entertain an instinctive and unreasoning timidity which can be overcome only by slow, careful, and quiet instruction involving judgment and tact on the part of the instructor.

Before a recruit is allowed to mount a horse, his confidence can and should be gained to a considerable degree by strengthening his riding muscles through the suppling exercises (264–278), performed on a wooden horse; at the same time he should be taught the correct seat (283–284). This work is under a riding instructor or under a gymnastic instructor who is a good horseman.

The exercises on the wooden horse may be usefully employed during subsequent training, but should not immediately precede or follow a riding lesson. Exercising tired muscles is not only useless but harmful.

Only quiet, gentle, and well-trained horses are used in the instruction of recruits. Effort must be made to avoid falls or other accidents which might spoil the beginner's nerve and so retard his progress.

With this object in view the beginner is permitted to use the same horse for the first few mounted lessons. When it is seen that he is beginning to understand his mount, horses and riders are changed, usually with each lesson, and the training of a soldier should be considered incomplete and unsatisfactory until the average animal goes quietly and pleasantly with him at any pace.

For the first few lessons, both as a measure of security and to avoid weariness, stirrups should be used. In some cases greater security is also afforded if the stirrups are connected by a strap passing under the horse's belly and of such length

that the man's knees are not drawn away from the saddle. The strap saves falls because it prevents the rider's legs from flying out far in any direction and the confidence it instills enables him to acquire balance more quickly.

Later lessons, both for the purpose of acquiring confidence and learning balance, must include riding without stirrups. Confidence is also imparted through riding without reins. This is one of the best ways for a beginner to acquire a good strong seat which is independent of the reins. Fixity of the seat helps to produce good hands.

The early mounted lessons are conducted at a walk. The trot and then later the gallop are taken up as soon as practicable, but not until the instructor judges that the confidence acquired justifies proceeding to the faster paces.

Exercises Favorable to Imparting Confidence.

261. 1. Suppling exercises (**264–278**) on the wooden horse.

2. Mounting the beginner on a quiet, gentle, and well-trained horse held and led by a dismounted or mounted assistant.

3. The exercises prescribed in paragraphs 344 to 362, executed in the early lessons at a walk, then progressively as confidence is established at the increased gaits.

4. Suppling exercises first at the halt, then progressively as confidence is established, at the walk, trot, and gallop.

2. Suppling the Rider to Secure Independence of Movement in Hands, Body, and Legs, and to Combat Rigidity.

262. Suppling exercises play an important part in the instruction of the rider, but their use demands tact. Used by some instructor, without order or method, or for too prolonged a period, they give only mediocre results; by others, however, they very quickly improve even the least gifted riders.

Considered together the suppling exercises have a triple end, as they serve to obtain—1, general suppleness; 2, suppression of involuntary movement; 3, regularity of position.

The instructor chooses and groups for these three objects the ercises which to him appear most suitable.

In the first two cases the exercises commanded are addressed the whole section, since the instructor seeks a general result. the last case, however, the proper exercises should be se-cted for the individual rider, since it is a question of over-ming an individual defect. It must be remarked also that me of the exercises oppose each other, and when they are ed the object sought must be exactly known. Thus the ele-tion of the thighs, particularly favorable in placing the seat, idently destroys the benefits from the rotation of the thighs stined to bring the flat surface to bear and to lower the knee.

At the end of several weeks of well-conducted instruction con-lence is established, the contractions diminish, the riders com-ence to find and keep a seat in the saddle, their joints are ore supple; in consequence their movements are best con-pled. The position is established.

The suppling exercises on the horse are taken up as soon as e rider has acquired a fair degree of confidence in his seat, d they are then regularly practiced throughout the entire ntinuance of riding instruction.

The exercises are performed in the saddle usually with irrups crossed or detached; always with snaffle bridle and ver with spurs. The reins are held or not at the discretion d direction of the instructor. When the exercises are suit-le, and when they are being executed without reins, the in-ructor causes the rider to hold one or both hands as though ey were actually riding with the reins.

The reins when held should neither flop nor be too tight. In word the instructor should seek to teach his pupils just to el the horse's mouth, while leaving the horse the free use of neck by following its movements with the hands. This feel-g, in developing little by little, will serve to establish the prin-ple of gentle contact of the hand with the horse's mouth. It ust be constantly spoken of and sought from the beginning. In short time the man follows instinctively the movements of e head and neck.

Constant effort should be made to overcome stiffness of the arms and shoulders, which is frequently the cause of a heavy hand.

The instructor is especially careful that the movement of one part of the body does not react on any other part; for example, that an exercise of the right arm does not disturb the left arm or the position of the loins or legs.

263. The exercises herein indicated are recommended as the most useful, but they are not the only ones in which the men may be exercised.

Instructors may add other suitable exercises for the purpose of varying the work and adding to its interest.

Any movement is proper which engages the rider's attention and leads him to forget that he is on horseback and thereby brings about relaxation.

The end desired is attained by the frequency and variety of the exercises; the instructor must carefully avoid prolonging a movement to weariness, which inevitably brings on rigidity.

He must likewise avoid any movement that would result in lifting the buttocks from the saddle or in sinking the loins and hollowing the back.

The exercises are first given at the halt, then, except as indicated and as confidence is established, they are progressively taken up at the walk, trot, and gallop.

To put the squad in march the instructor designates a man, preferably an enlisted assistant, who is a noncommissioned officer or an instructed private and who is mounted on a steady-gaited horse, to act as leader, and causes him to take the track; he then causes the other men to take their places in column of files behind the leader. The riders are restricted to letting their horses follow those in front.

At first the pace of the trot should be moderate. It may be increased to normal when the riders have acquired sufficient steadiness of seat to maintain a correct position at that gait.

As soon as the riders have acquired a fair security of seat at the trot and have grown accustomed to a fast gait, the instructor begins to train them at the gallop. The first lessons

re given on a large circle so that the horses will have less endency to pull. The men retain their reins and stirrups until hey have gained confidence.

The gallop should be employed very early in the instruction, s it is the most favorable gait for suppling the loins.

Every effort should be made to maintain good humor; it is he best aid to suppling. Instructors and pupils must ever bear n mind that the greatest obstacle to good horsemanship is ***bad emper*** in either rider or mount.

In those mounted suppling exercises, the purpose of which s to push the buttocks to the front, to spread the thighs at he hips, or to lower the position of the thighs and knees, the est results are always obtained by slightly elevating the toes nd depressing the heels during the exercise. On completion f the movement the rider then permits the toes to fall and the eg and foot to hang naturally.

To execute the exercises a movement is announced and the ommand ***EXERCISE*** is given. The movement is then continued nd repeated until the command ***HALT.*** The reins when held are hifted as necessary, without command.

Suppling Exercises.

FLEXION OF THE LOINS.

264. ***BEND TO THE RIGHT (LEFT):*** The rider, ***without deranging his seat, legs,*** or ***the position of his hands,*** slowly inclines his body to the right by bending at the loins. The head, shoulders, and arms conform to the movement of the trunk. He returns slowly to the initial position.

This exercise can profitably be used to combat general contraction, stiff back, stiffness in the loins.

265. ***STROKE RIGHT (LEFT) FLANK:*** The rider sits down in the saddle by pushing the buttocks forward; turns the body at the loins, and leaning backward but not to the side, places the right hand as low as possible on the horse's flank.

To combat general contraction, stiff back, leaning forward letting buttocks rise and go too far to the rear, riding on crotch legs sticking too far to the front, stiffness in the loins.

266. 1. ***RIGHT (LEFT) HAND ON CANTLE,*** 2. ***LEAN BACK:*** The rider places the palm of the indicated hand on the cantle of the saddle so that the arm rests against his body at or below the loins. He pushes his legs and knees well down and elevates his toes. Without deranging the position of his legs or thighs, and without pulling on the reins, he slowly leans to the rear as far as he can, touching the croup of the horse if possible, with his head, which is well thrown back. He returns slowly to the initial position. Executed only at the halt or the walk.

To combat general contraction, stiff back, thighs carried too high, legs pushed too far to front. It is also the best exercise for suppling the muscles of the groin. This exercise should not be used until the position of the buttocks and thighs has been fairly well established by other simple flexions.

ROTATION OF THE LOINS.

267. ***RIGHT (LEFT) HAND STROKE LEFT (RIGHT) HAUNCH.*** The rider turns to the right at the loins, ***being careful not to derange*** the seat or the ***position of the other hand or of the thighs*** and strokes the right haunch with the left hand. He avoids opening out the other elbow or pulling on the reins. He turns his head, but is careful to keep it erect.

To combat general contraction, stiff back, unsteady hands, or involuntary movement of the rein hand.

STRENGTHENING THE THIGHS.

268. ***GRIP HORSE WITH THIGHS AND RELAX:*** The rider without deranging seat, body, legs, or arms, squeezes his thighs together as though he wished to crush the horse between them.

To combat loose, wobbly, insecure seat insufficient strength in the leg muscles.

ROTATION OF THE ARMS.

269. *ROTATE RIGHT (LEFT) ARM VERTICALLY:* The rider ıkes a deep breath while extending his arm upward to its full ıtent, where he pauses a moment, and then describes slowly, ith uniform movement, large vertical circles from front to rear nd from below upward, exhaling and keeping the head erect nd high while the arm is descending.

To combat general contraction, stiffness in the shoulders, con-ıaction in the arms, depressed chest, round shoulders. This ıercise is especially valuable for giving the upper body a proper ›ise and posture upon the hips and for opening the chest and ıoulders.

270. *ROTATE RIGHT (LEFT) ARM HORIZONTALLY:* The rider ıtends his arm forward, palm up, and describes slowly, with ıiform movement, large horizontal arcs from front to rear and ack to the front constantly, keeping his eye upon the palm of he hand. The seat and thighs must remain fixed, the upper body otating at the loins. The other hand must remain in place. he rider avoids opening out the other elbow or pulling on the ins.

To combat general contraction, stiffness in the shoulders and ı the loins, contractions in the arms.

Properly executed this exercise becomes at once the simplest nd one of the best means of acquiring balance. To be executed roperly the rider must constantly keep his eyes upon the alm of the hand. Its most important use is during jumping › overcome the involuntary contractions and movements usu-lly shown by the beginner. The exercise should be begun efore the obstacle is reached, continued throughout the jump nd until at least 30 yards beyond the obstacle.

CARRYING THE HEAD.

271. *TURN HEAD RIGHT AND LEFT:* The rider sits erect on is horse with his head up and eyes sweeping the horizon. Vhile in this position and without deranging any other part of

his body he slowly turns his head as far as he can first to the right, then to the left.

To combat leaning to the front and carrying the head and eyes too low.

272. *BEND HEAD FORWARD AND BACKWARD:* The rider sits erect on his horse with his head up and eyes sweeping the horizon. While in this position and without deranging any other part of his body he throws the head up and back as far as he can, returning slowly to the initial position.

To combat leaning to the front and carrying the head and eyes too low.

ROTATION OF THE THIGHS.

273. *ROTATE RIGHT (LEFT) THIGH:* The rider carries the knee outward from the saddle, then moves it to the rear straightening the leg, toes slightly elevated, heels depressed; he then turns the knee in as much as possible and replaces the thigh flat upon the saddle. All muscles are then relaxed and the leg and foot are permitted to hang naturally.

To combat general contraction, leaning to the rear with thighs rising to the front, rolling the thighs away from the saddle and holding on with the calves, toes turned out too much, knees bent too much, daylight under knees.

FLEXION OF THE THIGHS.

274. 1. *HANDS ON POMMEL,* 2. *RAISE RIGHT (LEFT) THIGH AND KICK TO THE REAR:* The rider places both hands on the pommel and draws himself forward and into the bottom of his saddle. He raises the thigh to the front and slightly away from the horse's side, then with toe raised, heel well pushed down, he kicks to the rear as if to strike between the horse's hind legs; he straightens the entire leg in the direction of the horse's hock. He slowly brings the flat of the thigh to its position against the saddle.

To combat general contraction, leaning to the rear with thighs rising to the front, rolling the thighs away from the saddle and holding on with the calves, toes turned out too much, knees too high, daylight under knees.

RAISING THE THIGHS.

275. ***RAISE RIGHT (LEFT) THIGH:*** The rider raises the knee ly so much as is necessary to detach the thigh and leg from e saddle. He slowly returns to the initial position.

To combat lack of independence in the use of the legs, leaning the front and riding on the crotch.

276. ***RAISE BOTH THIGHS:*** The rider raises both knees only much as is necessary to detach the thighs and lower legs om the saddle; he inclines the upper part of the body back- ard very slightly, maintaining a convex bend at the small of the ck. If the rider is sitting too far back in the saddle, the structor directs him to draw himself forward by grasping the mmel for a moment.

In order to maintain his balance and seat in this position, e rider is compelled to relax and be flexible and supple.

When his equilibrium is well established, the rider gently places his thighs upon the saddle, being careful to keep his ns in the same position as during the movement.

This exercise fixes the seat and the loins in place and puts em in the proper position. It is executed only at a walk at a slow trot.

To combat general contractions, stiff back, leaning forward d riding on the crotch, sitting too far back in the saddle.

FLEXION OF THE LEG.

277. ***FLEX RIGHT (LEFT) KNEE:*** The rider bends the leg rly without deranging the position of the knee or that of the dy.

To combat general contraction, lack of independence in the use the legs, riding on the crotch.

FLEXION OF THE ANKLE.

278. ***FLEX RIGHT (LEFT) ANKLE:*** The rider traces with the signated foot, by a slow and uniform movement, a circle from low upward and from outward inward without disturbing the sition of the leg.

To combat general contraction, stiffness in the ankle joi
lack of independence in the use of the legs, toes turned out t
far, knees and thighs rolled away from contact with the hor
holding on with the calves.

Mounted Gymnastics.

279. Mounted gymnastics comprise exercises that, if pr
erly conducted and not pushed beyond the capabilities of t
average man, are valuable for suppling the rider and impart
confidence. Those exercises that may occasion hard falls
those that a few men can do and others can not do are destr
tive of confidence and harmful to progress in equitation, si
the soldier who can not do them is prone to think that he
too poor a gymnast to be a good rider. The exercises, th
should be such that every man, with a little practice, can perf
them with a fair degree of proficiency.

Mounted gymnastics in themselves are not an object of
struction. They are but a means to an end and must be
considered.

The exercises outlined below are good, though not the
ones that the instructor may employ. They are divided into
groups, those with the horse in place and those with the ho
in motion. The men are in shirts and gymnasium shoes
without hats.

Exercises with the Horse in Place.

280. These exercises may be performed on any gentle hor
The reins are knotted and placed on the neck. In some ca
it may be necessary for an assistant to stand at the horse's he
The animal may be bareback or saddled with stirrups detach

1. Mount and dismount, or inversely.
2. To the right, mount and dismount, or inversely.
3. Being mounted, faced to the front, place the hands on th
pommel or the withers, then rise on the hands and extend th
legs to the rear until about 1 foot above and parallel to th
horse's back, then immediately snap them forward, keepin

iem close to the horse's sides and regain the natural seat. his exercise is very good for obtaining a deep position of the iees.

4. Being mounted, faced to the front, extend legs to the rear, oss them, and regain seat faced to the rear. This is called *e shears.*

5. Being mounted, faced to the rear, place hands on pommel or ithers, extend the legs, execute the shears over the croup, and ce to the front.

6. Being mounted, faced to the front, lean forward and place e right or left shoulder on the withers, extend the legs upward, id stand on the shoulder. From this position spring to the ound or regain the natural seat.

7. Being mounted, faced front or rear, swing one leg over neck croup and take the side mount. In the side mount the po- tion of the body and legs is approximately that which is as- med in a side saddle.

8. Being mounted, faced to the rear, place hands on croup and ap to the ground behind the horse.

9. Being mounted, faced to the front, squat on both feet. rom this squatting position stand up, then pressing feet and gs hard against the horse's sides slide slowly down into the at. This exercise is good for strengthening the thighs.

10. Being in rear of the horse, take a short run, place hands on oup, and leap into seat faced to the front.

11. Same, doing shears while executing the leap, and land on ie horse's back faced to the rear.

12. Being mounted, faced to the front, bend to the front and ownward and while one hand holds a lock of mane, reach with ie other as near to the ground as possible, keeping the legs and uttocks approximately in place.

Exercises with the Horse in Motion.

281. These exercises are best performed with a specially elected and trained horse on the longe on a large circle. The orse is preferably rigged with an improvised leather girth, held

in place by a standing martingale and having a leather hand on each side of and about 6 inches below the line of the bac To prevent the girth from turning it must have a pommel ard In order to make the animal go steadily and smoothly the sid reins should be fastened to the girth.

The gait used should be a very slow, steady gallop. For section of 16 men two horses should be kept going at a tim and, as the work is very hard on them, they should be chang for others at the end of 15 minutes. For 16 men one-half hour any one lesson period is sufficient time to devote to this instru tion.

1. Being mounted, execute any of the suppling exercises.
2. Dismount and mount faced to the front.
3. Being mounted, extend the legs to the rear.
4. Being mounted, face front or rear, throw leg over neck croup and take the side mount.
5. Being mounted, execute any of the suppling exercises wh the horse goes over a 1½ to 2 foot jump.
6. Being mounted double, man in rear dismounts and mou
7. Being mounted double, man in rear dismounts and mo standing.
8. Dismount and mount faced to the rear.
9. From the side mount facing to the front, dismount a mount facing to the front or rear.
10. Being mounted, place outside foot through outside han grasp inside handle with outside hand, and reach for so object on the ground.

282. The rider when dismounting, vaulting, or leaping, gra a lock of mane in front of the withers with the hand on the s toward which he intends to dismount, and grasps the handle the same side with the other hand. During the exercises, w dismounted, he keeps pace with the horse at the latter's shou by means of the *galloping step,* which he executes, keeping hands in place, by a succession of leaps, rising and aligh with the rise and fall of the forehand of the horse, keeping left or right foot in advance according as he is on the le

ight side of the horse, and supporting his weight on the balls f the feet.

To secure a proper leap for vaulting back onto the horse, he rider, whether he leaps from the galloping step or from his anding place, plants his feet squarely together, facing the ront, and makes the leap from both feet.

A proper leap can not be made if the elbow nearest to the orse is carried up on the animal's back. This elbow must be lown along the horse's side, as otherwise the man is too close o and jumps against his horse in trying to make the vault.

When mounting double, with the horse in motion, the man n the ground grasps the rider's belt with the hand nearest he horse and the rider's elbow with the other. The rider takes are to assist in the leap by pulling strongly against the dismounted man as the latter springs from the ground.

3. Establishing a Correct and Firm Seat Independent of the Reins.

283. The successful application of the leg aids depends upon the seat, which may be defined as the ability of the rider to keep his balance under all circumstances, whatever the reaction of the horse. A good seat is the first essential because it is the basis of stability and therefore of confidence. Its attainment is aided by the acquirement of the correct position of the soldier mounted (**256–257**) by the suppling exercises, and by much riding without reins or stirrups.

The rider's position is in all probability correct if he has a good, firm hold with the upper leg, his legs and heels are well shoved down, his feet are approximately parallel to the horse's side, his calves have a light feel of the horse's sides at about the rear edge of the girth, and his stirrup straps hang vertically.

The importance of getting the lower legs to the rear as indicated can not be overestimated. They are the logical rudders for the horse, as they control practically all of his body in rear of the forehand. They drive his haunches under him, thus assisting him to start, back, stop, turn, or jump.

A light pressure of the calf must be maintained against the horse's side, for otherwise the rider can not apply his legs with sufficient nicety to bring his horse to a high state of responsiveness. If a horse is too sensitive to the legs or nervous, and is ridden with legs free from the sides, except when a movement is desired, the animal becomes unsteady, due to lack of support from the legs and to their irregular application.

Many men find trouble in keeping the stirrup straps vertical and the heels lower than the toes. Both difficulties are due to the thighs working up toward the horizontal and the seat sliding out behind. This fault is corrected by pushing the buttocks forward into the deepest part of the saddle, getting the heels lower than the toes by a movement of the ankle joint; then, still keeping the heel in this position, bending the knees so as to carry the feet to the rear until the stirrup straps are vertical. In very difficult cases the stirrup straps should be tied to the girth, so as to hang vertically. The instructor knows that the position of the leg is correct when, with the buttocks shoved forward, the stirrup strap hangs vertically or when a vertical line dropped from the front of the rider's shoulder is tangent to his heel. The rider knows that his legs are in the proper position when, with his buttocks shoved forward and his upper body held vertically, he finds in glancing down over his knees that his toes are just hidden by his knees. These tests are simple and positive.

The toes should not be permitted to turn out excessively, else the pressure with the inside of the thigh and knee will be lost; neither should the toes be turned in excessively, else the light contact with the calves will be lost. The feet should be kept into the horse's side and not shoved out.

In order to have a good seat the whole body, especially the ankle joints, must be supple.

The tendency of most beginners is to support themselves and maintain their balance by a firm hold of the reins, thus ruining the horse's mouth and spoiling his temper through constant worry and torment. This tendency must be combated from the very start, since holding on by the reins is a fault which if once

earned is most difficult to eradicate. Correct balance, moreover, s much harder to learn if a convulsive grasp of the reins serves :o prevent the man's body from accommodating itself without :igidity to the movements of his mount.

A balanced seat, independent of the reins, can only be certainly and surely learned by much riding without reins and stirrups. A safe principle, that with profit can be applied to most men, is that they should not be intrusted with reins until it is perfectly immaterial to them whether they have reins or not. When this is the case they can take the reins and very soon be able to hold them so that the light elastic feel of the horse's mouth is constantly maintained, and this, as it should be, quite independent of their own bodily movements.

284. Favorable exercises to be used in establishing a correct and firm seat independent of the reins are:

1. Riding without reins and stirrups.
2. Suppling exercises.
3. Jumping.

Riding Without Reins and Stirrups.

285. Riding without reins should be begun with the very first mounted lesson, and thereafter throughout the entire period of elementary instruction a portion of each lesson should be devoted to it.

The instructor causes the riders to take the track behind a leader, and to drop their reins as soon as their horses are going quietly and smoothly. For the first few lessons the gait is confined to the walk, then as confidence is established it is pushed to the trot and later to the gallop. At each gait stirrups should be retained until the riders have lost all sign of nervousness, when they should be abandoned and the work continued without reins or stirrups.

When riding without reins the instructor causes the men to fold their arms in front of their bodies, or place their hands on the hips, overhead, to the side, to the front, etc., or hold them as though they were holding the reins, and at the same time

he sees that they do not derange their seats. The movement of the arms in this manner assists in bringing about relaxation and in acquiring balance.

When riding without reins for the first few times, it may be found advantageous with some men to have their horses led by an instructed soldier, who, in this case, may be either mounted or dismounted. Another method is to put the horse on the longe for the first few lessons without reins.

Suppling Exercises.

286. These exercises afford one of the very best means at the disposal of the instructor for establishing a firm seat independent of the reins. They are conducted as prescribed in paragraphs 264 to 278.

Jumping.

287. Jumping is an equestrian art that, in its finished form the field artillery soldier does not need sufficiently to justify spending the time necessary to acquire it. But it is so valuable a means of teaching firmness of seat, balance, and suppleness of body that it can, with the greatest profit, be taken up and pursued in an elementary way during the instruction of the field artillery soldier in riding. On frequent occasions it should be combined with simple suppling exercises.

The horses used in this instruction are preferably the riding horses of the battery, although team horses may be used even to their advantage rather than detriment provided the obstacles are alway those of height and never those of breadth, such as ditches, small streams, etc., that the horse might encounter and be tempted to jump while in draft. Galloping and jumping only serve to exercise and strengthen the large muscles of the back, loins, and quarters, needed and used most in the work of draft. The riding horses, especially those used by the battery commander's detail, should be trained to negotiate all reasonable obstacles, and they are therefore very suitable for this work.

Jumping should be begun as soon as the men have reached the stage of galloping without reins or stirrups. At first the

stacle is very low, beginning with a bar laid on the ground. is then raised slightly from time to time until it reaches 2 et. This height should not be exceeded.

From the very first jumping should be without reins. Stir- ps should be used until confidence is established, when they so should be discarded.

In some cases it may be found advisable to have the first mping done with the horse on the longe, but care should be ken in this case always to give the animal plenty of rope on nding to avoid bringing him around on a sharp circle, thereby creasing the difficulties of the rider. In any event the be- nner should be permitted to hold the pommel of the saddle a lock of the mane until he has become accustomed to the otion of the horse and has acquired confidence. Thereafter e arms should be folded across the chest or held as if the reins ere in the hands or should be engaged in executing some of the mple suppling exercises. It may also be found advantageous join the stirrups by a strap under the belly for the first few ssons, as this prevents the beginner's legs from flopping away om the horse's sides.

The jump is made as follows: On approaching the obstacle ghten with knees and thighs, the body leaning slightly to the ont; at the moment the horse rises bend the upper part of the dy forward at the waist, the buttocks remaining in the saddle; the horse alights sit well down in the saddle, but without shing the legs to the front.

During the entire period of the jump the upper part of the der's body should remain inclined at about the same degree to e front of the vertical. This slight leaning to the front de- nds upon the speed, and is just sufficient to keep the rider ng steadily and firmly with his horse.

In the take-off, therefore, the neck of the horse approaches the der's chest, and in the landing his croup approaches the rider's ck, while in the summit of the leap the body of the rider and e back of the horse bear the same relative position to each her that they did before the jump was made. The bend which e rider makes to the front at the waist as the horse takes off

is just sufficient to take up the sudden and powerful thr which the horse makes with his hind feet as he leaves t ground. The rider shows poor horsemanship, either at t take-off or during the jump, if he "hangs on" behind t motion of the horse. The rider always endeavors to keep in u son with his horse whatever changes in rhythm or pose t latter may make. In approaching and making the jump it essential that the rider's loins be supple and the small of b back convex.

In general, the horse should jump at the gait at which approaches the obstacle; if he hesitates, the rider should sti late him vigorously with the legs. It will be found, howev that almost no refusing occurs when both horses and men h been trained to jump without reins.

A dismounted man with a can of oats should be posted a sh distance beyond the jump, as in the corner of the school, a each horse on finishing the jump should be conducted to t point where he is rewarded with a handful of the grain. this practice is followed, it will be found that the horses t jumps willingly, calmly, without undue fatigue, and will rush after the jump has been passed.

After a certain amount of practice over one jump a sec should be placed at a distance of about 5 yards from it, and t men required to negotiate the two. Later on others may added until four or five are taken in succession. This practi which is frequently combined with simple suppling exercises, most excellent in establishing a correct and firm seat independe of the reins and in obtaining suppleness.

When the men have become expert in negotiating these jum without reins or stirrups they are gradually trained to hand the reins when jumping, the object being to teach the rider t keep off the mouth of his mount, no matter what the reaction of the latter may be.

The horse must have the free use of his head and forehan during and after the jump, hence the instructor must exercise th greatest care to see that the men use hands and reins in such manner that the horse's mouth is not ill treated. The loins an

ps should go with the movements of the horse, and the shoulder
ints should be given free play when the horse requires more
in; all jerky movements of the arms and wrists will then be
oided as the hands go forward. Reins must be held long, and
e man taught to keep his hands low and allow them to come
ely forward as the horse is on the downward plane. In some
ses it will be found necessary to require the rider to let the
ins slip through his fingers in order to allow the horse to jump
hampered.

In order to derive the greatest profit from jumping lessons
e riders are required to change horses with great frequency.

CTION VI.—ELEMENTARY TRAINING IN EQUITATION AND HORSEMANSHIP, SECOND PERIOD.

Teaching the Aids and Their Correct Application in Controlling the Horse.

288. The means at the disposal of the rider for controlling
e movements and gaits of his horse are his ***legs, reins,*** and
ight. These are termed ***the aids.*** On suitable occasions the
ls are assisted or emphasized by a proper use of the ***spurs,***
whip, and the ***voice.*** According to their very nature, the legs
e the driving while the reins are the restraining aids. Both
e effectively assisted by the weight of the rider. Of the two
ls, the driving and restraining, the former are overwhelm-
ly predominating. As the training of a horse or rider pro-
sses, the aids must become more refined and less noticeable
til the horse, without perceptible effort on the part of the
er, seems to obey the latter's thoughts alone.

Leg Aids.

289. The legs should be free from all involuntary movement
d very steady in their action. A swinging leg confuses the
rse. The legs act by the pressure of the calves with heels
ll shoved down. They are applied gradually, according to
e sensibility of the horse, so that the latter will not be sur-
ised and give a sudden start. If pressure alone is insufficient

the rider increases the action by taps with the calves, increasi in severity until obedience is obtained, when the action shou cease.

The position of the lower leg determines the nature of t effect. Thus, if both legs are applied near the rear edge of t girth the effect should be to drive the horse forward or to i crease his gait, while if one leg is drawn and applied a lit further to the rear its effect, according to the intensity of i action, should be either to induce or to oppose a lateral displa ment of the haunches. When the leg is thus drawn to the re its position and action are referred to as either *sideward drivi* or *supporting*.

Rein Aids.

290. The reins serve to prepare the horse to move, to perm an extension of his gait, to reduce his gait, or to change dir tion. For effects to be exact the reins must maintain *conta* that is, a soft elastic bearing of the bit on the bars of the mou A man who rides with this soft elastic bearing—that is, w contact—is said to have a *light hand*. It is obtained by ma taining a smooth and steady seat, by keeping the muscles the shoulders and arms relaxed, and by keeping those of t fingers and wrists soft and springlike in their action. T hands should be perfectly steady, to insure which there shou be no motion of the shoulders or elbows.

A few men in seeking light hands ride with loose reins. Th is *no hand*, and should be avoided because the rider, having lo communication with the horse's mouth, does not have his mou under instant or prompt control. With the reins loose a flapping the indications of the hand will not reach the hors or if they do they will arrive confused or in the form of brut and awkward jerks.

A *heavy hand* is one which maintains such strong and consta pressure on the horse's mouth as soon to deaden it and destr its sensibility. A heavy hand soon gives a horse a *hard mout*

In producing these various effects the reins act by a tensio or a yielding. With a well-trained horse a sufficient increas

em close to the horse's sides and regain the natural seat. his exercise is very good for obtaining a deep position of the ees.

4. Being mounted, faced to the front, extend legs to the rear, oss them, and regain seat faced to the rear. This is called e *shears*.

5. Being mounted, faced to the rear, place hands on pommel or ithers, extend the legs, execute the shears over the croup, and ce to the front.

6. Being mounted, faced to the front, lean forward and place e right or left shoulder on the withers, extend the legs upward, d stand on the shoulder. From this position spring to the ound or regain the natural seat.

7. Being mounted, faced front or rear, swing one leg over neck croup and take the side mount. In the side mount the po- ion of the body and legs is approximately that which is as- med in a side saddle.

8. Being mounted, faced to the rear, place hands on croup and p to the ground behind the horse.

9. Being mounted, faced to the front, squat on both feet. om this squatting position stand up, then pressing feet and s hard against the horse's sides slide slowly down into the t. This exercise is good for strengthening the thighs.

10. Being in rear of the horse, take a short run, place hands on oup, and leap into seat faced to the front.

11. Same, doing shears while executing the leap, and land on e horse's back faced to the rear.

12. Being mounted, faced to the front, bend to the front and nward and while one hand holds a lock of mane, reach with other as near to the ground as possible, keeping the legs and ttocks approximately in place.

Exercises with the Horse in Motion.

381. These exercises are best performed with a specially lected and trained horse on the longe on a large circle. The rse is preferably rigged with an improvised leather girth, held

outer or *supporting* rein is the most favorable for teaching t Field Artillery horse, intended and used for draft, to step fre into the turn for which his head has been set and his neck be The direct rein alone finds constant application with the Fi Artillery driver in the control of his offhorse, as, for instan a feeling of this horse's right rein to cause him to bend a step into a turn to the right.

With the reins in one hand the turn is similarly execute except that the outer rein predominates in its bearing acti against the neck. Here the inner rein is shortened by turni the little finger toward or away from the body or by adjusti the reins before the turn was executed. The action of t hand is faulty if it crosses the withers.

All action of the reins should diminish in intensity wi obedience begins, and cease entirely as soon as the desired res is secured.

For equitation work riders can not be too strong in th legs, and very few of them are sufficiently soft and elastic the use of their hands. Most of the trouble the rider has handling his horse can be traced directly to too little use the legs and too much use of the hands.

During elementary instruction in equitation the reins sho be habitually carried in both hands, as this obtains quick results in the matter of hands and in the manageability of t horses. However, to prepare the rider for his work in drivi riding with the reins in one hand must not be neglected.

The Weight.

291. The weight of the rider when properly used in conn tion with the reins and the legs is a very important aid, whi moreover, is entirely independent of the sensibility of the hors mouth and sides. Its use enables the horse to understand mo intelligently and more easily to obey the leg and rein aids.

The use of the rider's weight as an aid will work to the bes advantage if the horse's and the rider's centers of gravity were previously in the same vertical line. The knack of going wit

ght side of the horse, and supporting his weight on the balls
! the feet.

To secure a proper leap for vaulting back onto the horse, ıe rider, whether he leaps from the galloping step or from his ınding place, plants his feet squarely together, facing the ;ont, and makes the leap from both feet.

A proper leap can not be made if the elbow nearest to the orse is carried up on the animal's back. This elbow must be own along the horse's side, as otherwise the man is too close) and jumps against his horse in trying to make the vault.

When mounting double, with the horse in motion, the man n the ground grasps the rider's belt with the hand nearest ıe horse and the rider's elbow with the other. The rider takes ıre to assist in the leap by pulling strongly against the dis- ıounted man as the latter springs from the ground.

Establishing a Correct and Firm Seat Independent of the Reins.

283. The successful application of the leg aids depends upon he seat, which may be defined as the ability of the rider to keep is balance under all circumstances, whatever the reaction of he horse. A good seat is the first essential because it is the asis of stability and therefore of confidence. Its attainment is ided by the acquirement of the correct position of the soldier ıounted (**256–257**) by the suppling exercises, and by much ding without reins or stirrups.

The rider's position is in all probability correct if he has a ood, firm hold with the upper leg, his legs and heels are well ıoved down, his feet are approximately parallel to the horse's ide, his calves have a light feel of the horse's sides at about he rear edge of the girth, and his stirrup straps hang vertically.

The importance of getting the lower legs to the rear as in- dicated can not be overestimated. They are the logical rudders for the horse, as they control practically all of his body in rear of the forehand. They drive his haunches under him, thus assisting him to start, back, stop, turn, or jump.

not been too great; and that he has not given confusing, contradicting, or incorrect indications. Punishment should never be administered in the heat of anger. Such a state of mind disturbs the understanding between rider and horse and undermines the confidence which the horse should have in his rider.

An independent seat and equestrian tact are absolutely necessary in using the spurs to reinforce the leg aids.

The recruit should not be permitted to ride with spurs until he has acquired a proper seat and balance, and until he has learned to apply the aids correctly.

The Whip.

293. The whip is used principally in training the remount to teach him to understand the action of the legs. It is also of important assistance to the Field Artillery driver.

It is not used in elementary instruction of recruits, since the tendency would be to depend on its use rather than to learn the proper application of the legs.

The Voice.

294. The voice, like the weight, is entirely independent of the sensibility of the horse's mouth and sides. It is particularly valuable in training the remount to understand and obey the rein and leg aids. It is not needed by the expert horseman on a properly trained horse, nor should it be used in the instruction of recruits, since the tendency would be for the rider to resort almost wholly to it, and thus neglect his rein and leg aids. For the Field Artillery driver it is of important and powerful assistance.

The Use and Accord of the Aids.

295. The beginner must not only learn how and when to apply a given aid, but he must also be made to understand why it should be applied.

To obtain successful results it is essential that the *aids* be applied at the right moment, also that they be applied correctly, as follows: First, their application must be intermittent, that is,

earned is most difficult to eradicate. Correct balance, moreover, s much harder to learn if a convulsive grasp of the reins serves o prevent the man's body from accommodating itself without igidity to the movements of his mount.

A balanced seat, independent of the reins, can only be cer-ainly and surely learned by much riding without reins and stir-rups. A safe principle, that with profit can be applied to most men, is that they should not be intrusted with reins until it is perfectly immaterial to them whether they have reins or not. When this is the case they can take the reins and very soon be ible to hold them so that the light elastic feel of the horse's nouth is constantly maintained, and this, as it should be, quite ndependent of their own bodily movements.

284. Favorable exercises to be used in establishing a correct nd firm seat independent of the reins are:

1. Riding without reins and stirrups.
2. Suppling exercises.
3. Jumping.

Riding Without Reins and Stirrups.

285. Riding without reins should be begun with the very first mounted lesson, and thereafter throughout the entire period of elementary instruction a portion of each lesson should be devoted to it.

The instructor causes the riders to take the track behind a leader, and to drop their reins as soon as their horses are going quietly and smoothly. For the first few lessons the gait is con-fined to the walk, then as confidence is established it is pushed to the trot and later to the gallop. At each gait stirrups should be retained until the riders have lost all sign of nervousness, when they should be abandoned and the work continued without reins or stirrups.

When riding without reins the instructor causes the men to fold their arms in front of their bodies, or place their hands on the hips, overhead, to the side, to the front, etc., or hold them as though they were holding the reins, and at the same time

Distance: The open space measured from the tail of the ho in front to the head of the following horse. Distances measured in *horse lengths* and in *yards.*

Boot to boot: Riders are said to be boot to boot when stirrups of adjacent riders touch.

Inner side: The inner side, in case of a horse placed straig is the side toward the interior of the school; in case of a ho that is bent or set it is the side toward which he is bent or The other side is the *outer side.*

Inner aids: These are the rein and leg aids on the inner of the horse. The other rein and leg aids are the *outer aids.*

Tempo or cadence: This denotes the speed with which a h covers a certain distance at a certain gait. A proper con tion of tempo implies also the presumption that the steps strides constantly follow each other in the same uniform in val of time and are always of uniform length. The tempo lively or slow, depending upon whether a great or small tance is covered in a particular unit of time.

Accurate tempo is the foundation of steadiness in all moveme Therefore every rider from the very beginning of his riding inst tion must learn to acquire this instinct for cadence and be able induce or produce it at all gaits and to sustain it uniform throughout any gait.

To the right (left) hand: A rider marches to the right or l hand accordingly as his right or left hand is toward the inter of the school.

Gathering the Horse.

297. Before the horse is required to execute any moveme he should be given a preparatory signal. Whatever the mo ment to be executed, the signal is always the same. Its obj is to attract his attention and to prepare him for a moveme This is called *gathering the horse.*

Having a light pressure of the bit against the horse's mou and a light feel of the lower legs against his sides, the rider, order to gather him, increases the pressure of the lower le with heels well shoved down, and slightly increases the tens

he reins. These pressures are increased intermittently until elastic movement of the horse under the rider indicates that former has observed the signal.

f, when at a halt, the horse backs, or when marching de- ises the gait, the tension applied to the reins has been too at. If, when at a halt, the horse moves forward, or when rching he increases the pace or gait, the impulse given with legs has not been met or controlled by the reins.

ach force should exactly balance the other, and the horse, l between the two, should feel responsive to the indications l aids of the rider.

To Move Forward.

98. Being at a halt: 1. *Forward;* 2. *MARCH.* At the first mand the rider gathers the horse; at the second he simul- eously (1) pushes his buttocks to the front, (2) acts with h legs according to the temperament of the horse, (3) eases the ns by slightly relaxing the fingers and giving the wrist, with- losing contact. The aids cease to be active as soon as dience is obtained.

To Halt.

99. Being at the walk: *HALT.* The rider sits well down in saddle and gathers the horse; he then simultaneously (1) es the fingers on the reins, bending the wrist, and, if neces- y, moving the hands in and back with the body; (2) slightly reases the pressure of the legs; (3) imposes the weight of his y against the horse's back by convexing his loins backward. s soon as the horse slackens the gait ever so little the pres- e of the fingers and legs is slightly relaxed to reward him his obedience. It is then reapplied and again relaxed until horse has completed the movement desired.

n order to prevent the horse from halting entirely on the elegs, the rider must increase the pressure of his legs to luce the horse to engage his hind legs farther under the mass. convexing his loins and imposing his weight against the mus- ar activity of the horse's back, the rider limits the function-

izing of the muscles which control impulsion and thus permit the hind legs to participate in stopping or in reducing the gait. It is faulty to lean back in an exaggerated position, because of the tendency to permit the legs and thighs to go forward and to act with a dead pull of the reins on the horse's mouth; if done abruptly, it is painful to a horse and may cause him to halt in a hard and jolty manner.

In reducing the gait a steady pull against the mouth must be particularly avoided.

The Half Halt.

300. The *half halt* finds constant application in the training of both horse and rider. It is a brief, energetic action of the hands, which the rider executes with the fingers closed on the reins by twisting the wrist quickly from below upward and from front to rear, without losing contact and without stopping the horse. At the same time the rider momentarily closes his legs and convexes his loins as in the halt. The half halt is used to slow up horses that are too ambitious or to carry to the rear the excess of weight that some badly balanced horses allow to come on the shoulders. It is effected according to need, on one rein, on two together, on the snaffle, or on the curb. The horse should regulate the power of its action by the resistance or weight which it meets.

Changes of Gait.

301. To pass from the halt or the walk to the trot or the gallop, the means prescribed for passing from the halt to the walk are employed and continued until the desired gait is taken.

To pass from a faster to a slower gait, or to a halt, the means prescribed for passing from the walk to the halt are employed and continued until the desired gait is taken or the horse has stopped.

The commands are: 1. *Trot,* 2. *MARCH;* 1. *Gallop,* 2. *MARCH;* 1, *Walk, MARCH;* and *HALT.*

Extending or Reducing the Speed at the Various Gaits.

302. To extend or reduce the speed at any gait the rider ıploys the means prescribed for passing from the halt to the ılk or from the walk to the halt to the extent necessary to ob-ın the desired results.

The horse in extending the walk increases the amplitude of e movement of his head and neck to the same degree as he in-ɛases the length of his step; he accelerates the movement of e head as he increases the cadence or tempo of his step.

The rider aids these movements by yielding the hand and ring the horse greater freedom of movement. He maintains ıtact so that he can exercise gradual restraining influence with ɜ direct rein when he feels the horse is about to spring into ɜ trot.

To reduce the walk the rider makes use of the direct rein and ɜs as in coming to the halt. The step is shortened and the dence or tempo decreased.

To extend or reduce the trot, the same means are used. The ɛrcises in extending and reducing the gait afford excellent ıctice for the rider in the use of the aids and good training ' the horse in obeying them, but the soldier out of ranks ɔuld use only the regulation gaits.

Changes of speed are executed at the commands: 1. ***Slow walk ot or gallop),*** 2. ***MARCH;*** or, 1. ***Walk (trot) out,*** 2. ***MARCH;*** or, ***tended gallop,*** 2. ***MARCH.*** The normal speed is taken at: 1. ***lk (trot or gallop),*** 2. ***MARCH.***

To increase or decrease the cadence or tempo at any gait the ıtructor may caution: ***Extend (Reduce) the gait.***

Changes of Direction.

303. At a walk the changes of direction are made on the arc a circle the radius of which is 3 yards. This is the sharpest rn that a horse can execute as a one-track movement. Such movement is one in which the haunches accurately follow the ıck of the forehand. At fast gaits, where the horse is more

or less extended and therefore harder to bend, the radius of the turn must be correspondingly increased.

To March by the Flank.

304. Being at the halt or marching: 1. ***By the right (left) flank,*** 2. ***MARCH.*** The rider gathers the horse; the right rein, acting as the inner or direct rein, leads the horse into the turn and induces the proper bend; the right leg, applied at the girth, drives the right hind foot forward. The left rein, acting as a supporting rein, regulates the set of the head, limits the radius of the turn, and, together with the left leg, applied behind the girth, bends the horse on the curve over which he is turning and prevents the outer hind feet from falling out. After the forehand has been led in the new direction the action of the inner rein is diminished, and as soon as the horse has turned through an arc of 90° he is straightened and then directed and maintained on the new line.

It is important that the horse's body from poll to croup be bent to conform to the curve over which he is moving. (Pl. 42.) This will at times require a modification of the application of the aids as described above; that is, if the horse tends to carry his haunches to the inside of the curve the action of the inside leg should predominate, while if he tends to carry them to the outside of the curve the action of the outside leg should predominate.

During the movement the rider takes care to sit slightly more on the inner buttock, without advancing or drawing back his outside shoulder.

When the reins are carried in one hand the action of the supporting or bearing rein predominates.

305. If the commands be: 1. ***Right (left) oblique,*** 2. ***MARCH;*** or ***Right (left) about,*** 2. ***MARCH,*** the arc of the turn is 45° or 180°, respectively.

Circles.

306. Riding on a circle, when properly done, is an exercise that is especially valuable for both rider and horse. It teaches

the rider properly to coordinate his rein, leg, and weight aids. By compelling the inside hind leg to flex itself more and to carry more weight than when riding on a straight line it supples, strengthens, and increases the handiness of the horse.

To ride a circle properly and exactly, the horse must be constantly changing direction. To do this he must be bent to conform to the curvature of the circumference. If the horse is properly bent on the circle, the imprint of each inner hind foot should follow that of the inner front foot, and the outer hind foot that of the outer front foot.

Application of the aids.—Before going on the circle from any track the rider should gather the horse by giving a half halt and should then slightly displace his weight by sitting a little more on the inside buttock. The aids are applied as in the turns—that is, the inner leg applied at the girth drives the inside hind foot forward—the inner rein gives the proper bend and set and conducts the horse on the circle at the tangent point. The outer leg applied behind the girth prevents the haunches from falling out. The outer rein assists the outer leg and regulates the set.

It is of great advantage frequently to vary the size of the circle so as to vary the bend of the horse.

To Back and Halt.

307. Being at the halt: 1. *Backward.* 2. *MARCH.* 3. *HALT.* At the first command the rider shoves his loins forward, gathers his horse, and straightens him. At the second command he reins back straight in the direction of the hind feet, inducing the horse to go back quietly in a straight line, one step at a time. With each step to the rear the reins are relaxed as a reward for the animal's obedience. The legs take a supporting position close to the horse's sides in order to prevent the haunches from escaping to either side.

At the third command the action of the reins ceases while the legs change their action from supporting to that of driving in order to check and stop the movement.

Since every loading down of the haunches will make the raising and setting back of the hind feet more difficult, the rider, if he meets resistance, should be careful not to lean back too far, but should lean forward slightly and push his loins forward. Likewise, the rider must avoid raising the horse's head, since an elevated position of the head also constrains the muscles of the loins and so renders the backward movement more difficult for the horse. If the horse refuses to back, he should be made to take one or two steps forward or to one side on the forehand to flex the muscles of the hind quarters and advantage then taken of this flexed condition to cause him to back.

Backing is not correctly done until the horse steps back thoroughly responsive to the aids and against the bit.

To avoid getting the horses *behind the bit* the instructor should always cause the riders to move their horses forward a step or two immediately after halting. Backing should never be executed for more than about 5 yards at a time.

To Turn on the Forehand.

308. Being in line or column at the halt: 1. *On the forehand,* 2. *To the right (left),* or, 2. *To the right (left) about,* 3. *MARCH.* The horse is first put up against the bit, or gathered. The rider then takes a slight set of the head toward the side of the turn. The inner right leg is applied behind the girth and when necessary is accompanied by the action of the inner rein. The haunches are swung step by step around the opposing forehand until a turn of 90° or 180°, respectively, is completed. Every step of the haunches is regulated accurately by the outer supporting leg applied behind the girth in such a manner that there is adecided pause between steps, thereby preventing the haunches from rushing. Both during and after the movement the rider's legs and seat should insure that the horse does not back but remains up against the bit. A stepping forward usually indicates a falling out of the outer shoulder and must be counteracted by the outer rein. The inner rein should not act

strongly as to bend the neck, except in case of a green se that does not understand the leg aids, or with a horse t offers resistance.

he turn on the forehand is not a real schooling lesson, be- se the haunches are disburdened and the horse thrown on the ehand. For this reason it should not be repeated very often. s a rule, turns on the forehand are practiced only in the ly training of the horse. Their principal purpose is to teach rider the correct use of the sideward driving inner leg aid. inner rein, and the outer supporting leg and rein.

s the movement has a great tendency to make the horse uctant in going up promptly against the bit, the turn should always immediately followed by a movement to the front at a e walk or at a trot, and it should never be exacted of young ses until the straight-ahead movement has been well con- ned.

To Turn on the Haunches.

309. Being in line or column at the halt: 1. ***On haunches,*** 2. ***the right (left),*** or, 2. ***To the right (left) about,*** 3. ***MARCH.*** e rider puts his horse against the bit, gathers him, and sets head to the side of the turn. The inner right rein begins d induces the turn, then carried well away from the neck, ds the forehand step by step around the haunches through a n of 90° or 180°, respectively. The inner right hind foot st be kept in place during the turn. To accomplish this, the ter rein should be reined in in the direction toward this foot. e outer hind foot must be prevented from falling out by the pporting action of the outer leg. Both of the rider's legs, but pecially the inner one, prevent the horse from stepping back ring the turn. It is a lesser mistake if the horse steps for- rd. The rider should place a little more of his weight on the ner buttock. (Pl. 43.)

The instructor must see that the rider's legs and weight are aced as above described and that the tendency to let the legs away from the horse's sides be completely overcome.

To Turn on the Forehand in Reverse.

310. Marching on the track to either hand: 1. ***Reverse,*** 2. ***MARCH.*** At the command ***march*** the rider leaves the track by an oblique. Having advanced far enough in this direction to place him from 6 to 15 yards from the track, the instructor adds ***NOW,*** whereupon the rider moves his horse back to the track over the arc of a half circle whose diameter is the distance thereto and retakes the track in the opposite direction. (Pl. 43.)

Application of the aids.—At the moment the half circle is begun the aids are applied and the horse is bent as if to march on this circle. Immediately thereafter the inside leg is slipped in rear of the girth to the sideward driving position and is applied to drive the haunches outward so that they describe an outer and larger circle than the forehand. The outer leg takes a supporting position behind the girth to prevent the haunches from coming around too fast. The swing of the haunches should be slight as the half circle is begun and should then increase as the track is approached. The lateral drive should be strongest when the forehand has almost reached the track, and the haunches are about 1 yard from it.

With recruits and remounts the turn should be made on a large continuous curve. The horse is therefore changing direction while gaining ground to the front. The diameter of the half circle described by the forehand is never less than 6 yards.

The principal object of this movement is to teach the horse to yield to the inside aids, especially the sideward driving leg. It is therefore of great value to teach the rider the coordination and use of these aids and to get control of the haunches of his horse. The movement finds practical application with artillery lead horses in the last phase of limbering as the team is straightening in the new direction.

Short About on the Haunches.

311. Being on the track to either hand and in march: 1. ***On the haunches,*** 2. ***Countermarch,*** 3. ***MARCH.*** At the last command the rider, with the outer rein, executes a half halt toward the

ner hind leg. At the moment the forward movement is interrupted, the rider sets the horse toward the turn and leads e forehand around the haunches, applying the aids as in the rn on the haunches. The haunches, therefore, describe an ner and smaller circle than the forehand. When the horse s been turned through an arc of 180° the rider obliques ck to and takes the track in the opposite direction. The outle lateral pair of feet should always step in front of the inside ir, and the diameter of the semicircle should depend upon e degree of training of man and horse. In the movement in finished form the schooled horse turns about his inner hind ot and therefore, on completion of the term, is about his n breadth from the track.

This movement is executed only at the collected gaits, and is t taken up by recruits until they show proficiency in coordinat their aids.

For the field artillery horse this movement finds constant actical application in limbering and turning.

Special Exercises on Two Tracks.

12. One-track movements are those in which the hind feet ck with the forefeet. Two-track movements are those in ich the horse is compelled to take an oblique position to the ection of march, and his forefeet and hind feet travel on two rallel tracks. All two-track movements are but a means to end, which is to increase the obedience, strength, suppleness, d hardiness of the horse. When practiced as a specialty or intensively, they do positive harm in that they reduce the tural tendency to go forward so desirable and necessary in artillery draft horse. The movements prescribed below are importance to the field artillery horse because of their conant application in turning and limbering. On this account y should be readily and easily performed by these horses, d the aids for them thoroughly understood and correctly plied by the riders.

As an artillery horse intended and used for draft should omptly and freely step into the turn for which his head has

been set and his neck bent, two-track movements, such as shoulder in or shoulder out, in which the head and neck are set away from the direction of motion, are of doubtful utility.

All two-track movements are very fatiguing and should not be prolonged beyond a few steps. They should be executed at gaits not faster than the slow trot; preferably, for artillery horses, at the walk. When taken up, the men should have acquired good seats and should have learned independence in the use of the aids.

Haunches Right of Left.

313. Marching to the right hand with three lengths distance between riders: 1. ***By file,*** 2. ***HAUNCHES RIGHT (LEFT).***

The command is given as the leading rider approaches the second corner of a short side of the school. (Pl. 42.) Each rider, as he comes onto the long side, executes the movement for a few steps, discontinuing it at the command ***STRAIGHT*** by the instructor.

Application of the aids.—As the forehand reaches the track of the long side the rider gives a half halt and gets the horse well up between his legs and reins. To begin the movement it may be necessary to set the horse's head slightly to the left by the direct action of the left rein. The left leg takes the sideward driving position and is applied with an alternating pressure in unison with the lifting of the left hind leg. It forces and keeps the haunches the desired distance from the track. This leg is also responsible for driving the horse forward. The right leg, applied at the girth, limits the displacement of the haunches. It prevents the horse from running from the opposite leg, from losing the cadence, and his forehand from leaving the track. It also assists in maintaining the collection and in holding the horse up against the bit. The reins maintain the direction and keep the neck straight. The right rein leads and is opened only so much as is necessary to give the direction; the left rein held low is closed and prevents the neck from bending. The weight is shifted slightly in the direction of motion.

At the command *straight*, the horse is pushed to the track on
lat curve and then driven straight ahead.

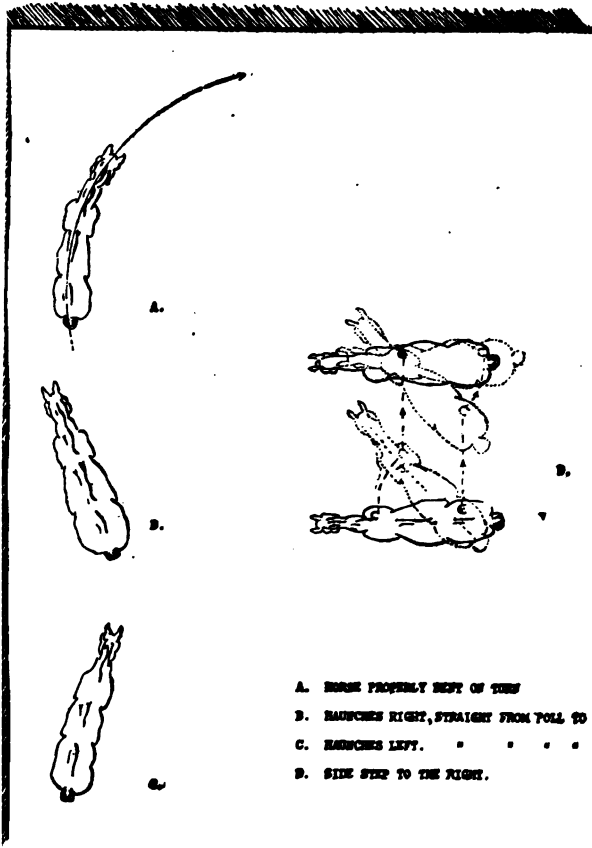

PLATE 42.

The movement is properly executed when the horse is straight
om poll to croup, but is set at an oblique to the direction in

which he is moving. The front and hind feet travel on t parallel tracks, the left fore and left hind stepping in front a across the right fore and right hind. The displacement of t haunches is very slight at first, and at no stage should re more than 45°. (Pl. 42.)

Haunches left may be executed when marching to the sa hand. In this case the rider passes through the second cor and turns onto the diagonal of half the school. The moveme is begun and similarly executed just as the haunches are abo to leave the track. The haunches travel along the track wh the forehand moves on a line parallel to and inside of it. (42.) When the displacement exceeds 45°, the forward tende is destroyed and the movements become cramped, while t excessive crossing of the feet may be the direct cause of i injuries that will develop harmful resistance.

Haunches In or Out.

314. Marching to the right hand with three lengths distan between riders: 1. ***By file.*** 2. ***HAUNCHES IN (OUT).***

The command is given as the leading rider approaches t second corner of a short side of the school. Each rider in vidually, as he comes onto the long side, executes the moveme for a few steps, discontinuing it at the command ***STRAIGHT*** the instructor.

Application of the aids.—On passing through the corner t rider executes a half halt as the forehand reaches the tra of the long side, and then begins the movement. The horse uniformly bent from poll to croup around the right leg appli at the girth. The forehand strides straight to the front on th track, while the haunches are displaced to the inside, the le hind stepping across and in front of the right hind. (Pl. 44. The right rein is shortened and maintains the necessary s of the head and leads the horse in the direction of march. Th right leg in combination with the right rein produces and main tains the proper bend. The left rein regulates the bend, fixe the neck at the shoulders, keeps the left shoulder from falling out, and supports the action of the outer leg. The left le

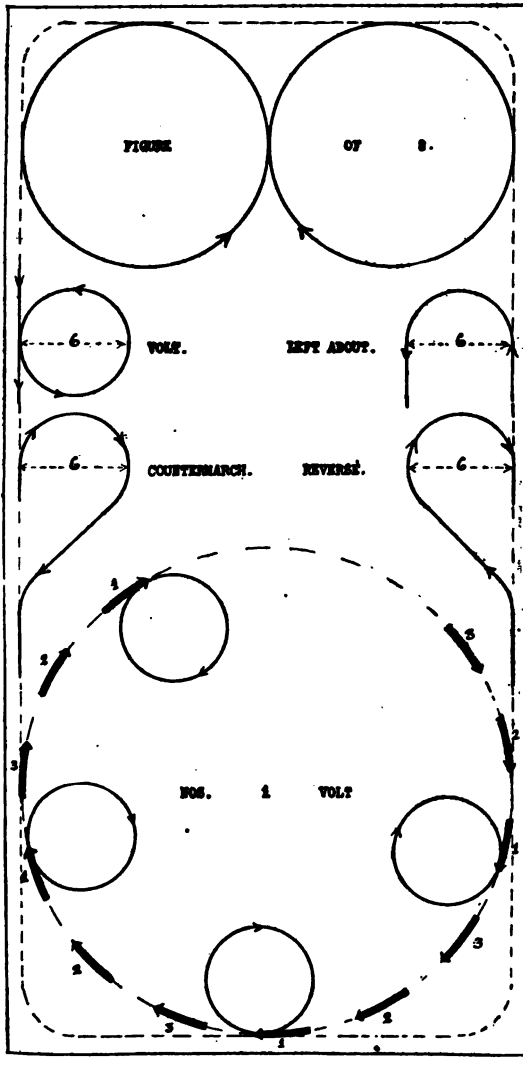
FIGURE
OF
8.
6
VOLE.
HEPT ADOUT.
6
6
COUNTERMARCH.
REVERSÉ.
6
1
2
3
3
2
1
2
3
3
2
1
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3
3
2

applied behind the girth displaces the haunches to the desired degree and maintains the forward drive. The weight is slightly displaced in the direction of motion.

At the command *straight* the horse is brought back onto the track by closing both legs, the inner predominating, and driving the horse forward in the direction of the forehand as on the circle.

Haunches out, when ridden on a straight line, is exactly the same as *haunches in.* It is developed by first leading the forehand off the track to the inside, and then displacing the haunches outward. (Pl. 44.)

In haunches in or out, the bend throughout the body depends upon the training of horse and man. For the work herein prescribed it should be slight, it being sufficient if the outside hind foot tracks with the inside fore.

Side Stepping.

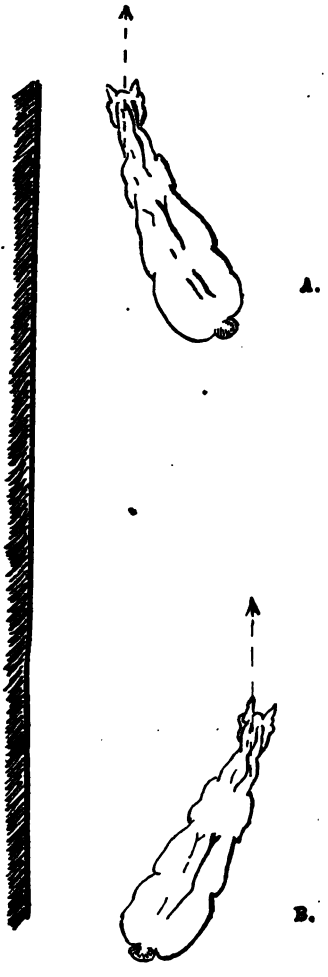
315. In this movement the horse steps sideward on the line of the original front. It is used in closing in when in line, and the movement as herein described is very similar to that required of artillery team horses in limbering. Being in line with intervals of one horse length: 1. *Side step to the right (left),* 2. *MARCH,* 3. *HALT.*

Application of the aids.—The rider gathers his horse, sets him, and applies the aids to turn him on his haunches to the right through an angle of 45°. He then applies the aids as in *haunches right* and moves the horse on two tracks parallel to the original front until the instructor commands *halt.* At this command the horse is halted and the aids applied to turn him 45° to the left on the forehand. The horse will then be about one pace behind the line, and is therefore straightened, moved forward up to, and halted on it. (Pl. 42.)

3. The Riding School.

GENERAL PROVISIONS.

316. The riding school is a convenient and favorable place for teaching the rider the proper application of the aids. It is



A. HAUNCHES-IN, UNIFORM BEND FROM POLL TO CROUP.

B. HAUNCHES-OUT, " " " " " "

PLATE 44.

also looked upon as a gymnasium for training and sch horses, for promoting their physical development, imp their balance and gaits, and confirming their obedience aids. However, whether the object be the training of ri horse, there must be a judicious interchange of work school, in the outside rectangle of large dimensions, and on the road and over varied terrain.

In order to teach the application of the aids or to . obedience thereto, it is absolutely necessary for the r prescribe accurately the path on which his horse is to If this is not done the rider becomes careless and inatt while his horse soon acquires bad habits, shows lack of ence and slouchiness of gaits and manner, and the great to be derived from work in the school are lost. The mos able means of counteracting this tendency is to place tive marks on the walls of the school, these serving as p direction upon which the rider can guide his horse execute the movements or figures with almost geomet curacy. These marks should be at a sufficient height to every man in the section, even when covering in colu see them.

The sides of the riding school are called the long and A good proportion is two to one. A favorable size is 3 yards. This is sufficiently and conveniently large for a of 20 men, and in case of necessity can be used for on men. The points at which to place the distinctive m a school of these dimensions are shown in plate 45.

In a riding school, unless otherwise indicated, the m at a distance of one horse length, and in passing the ru give way to the right except as specified in paragraph 32

Exercises.

317. The following exercises, though especially goo not the only ones that may be employed. The instruct supplement them by others, always bearing in mind t exercise employed should be for some definite object and be looked upon merely as a means to an end. It is of

e to make use of a great many different exercises, as by so
ng interest is increased.

'o make an explanation or to give instruction to all the
ı at the same time, the instructor by appropriate signal or
ımand gathers his pupils about him, dismounting them if
irable.

118. ***TAKE THE TRACK,*** or, ***TAKE THE TRACK TO THE RIGHT (FT) HAND IN REAR OF (such soldier):*** The track is that part the school extending 1 yard within the sides of the walls, corners being rounded off on an arc whose radius is 3 ds. (Pl. 45.) At the extended gaits the radius is increased yards for the trot and 11 yards for the gallop.

119. ***TAKE THE INSIDE TRACK:*** This track is indicated by marks placed 4 yards from each corner. (Pl. 45.) The ımand is given as the leading rider approaches a corner at ich place the change is made on a turn. To ride any other de track the instructor adds ***(so many) yards from the wall.***

120. To pass from the track to the track of half the school: ***TE THE HALF TRACK.*** The command is given as the leading ır approaches the open side of the half track, and the section ı rides on a quadrilateral in half the school. (Pl. 45.)

'o resume the track: ***TAKE THE TRACK.*** The leading rider again reaching the track remains on it without change of ence or gait.

121. ***CHANGE HANDS:*** The command is given as the leading ır approaches the second corner of a short side; having ned through this corner, he leaves the track at the 12-yard rk, crosses to and takes the track at the diagonally-opposite ard mark. (Pl. 45.) If the men are in two squads, the ling riders pass each other by going to the right.

122. ***THROUGH HALF THE SCHOOL, CHANGE HANDS:*** The ımand is given before the leading rider reaches the second ner of a short side or before he reaches the middle of a g side. The change is made from the 12-yard point beyond second corner of a short side to the middle of the opposite e or the reverse. (Pl. 45.)

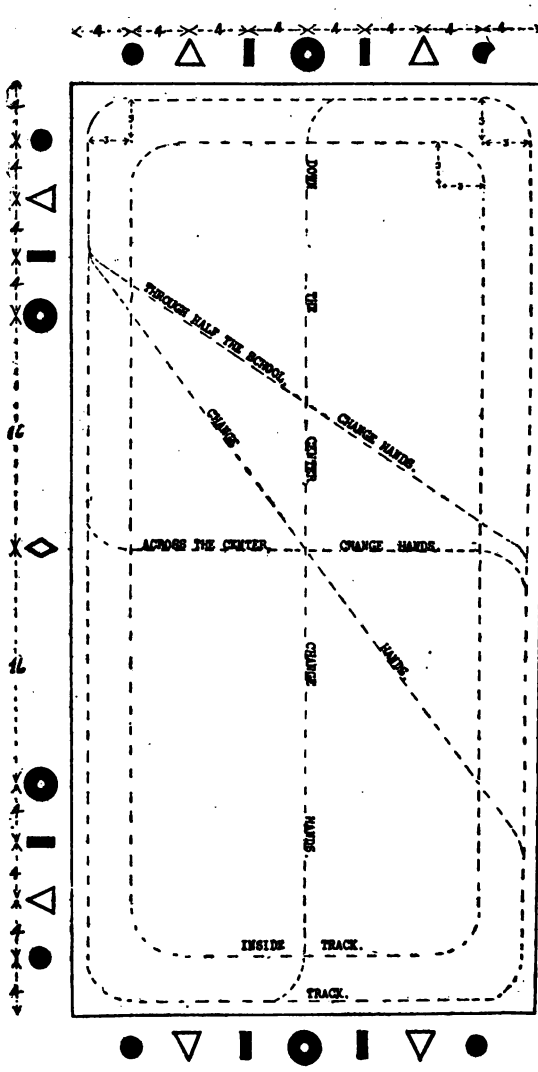

THROUGH HALF THE FIGURE
CHANGE HANDS
CHANGE
ACROSS THE CENTER
CHANGE HANDS
CHANGE
HANDS
INSIDE TRACK.
TRACK.

PLATE 45.

323. ***DOWN THE CENTER, CHANGE HANDS:*** The command is ven as the leading rider approaches the first corner of a short le. (Pl. 45.)

324. ***ACROSS THE CENTER, CHANGE HANDS:*** The command executed when the leading rider next reaches the middle point a long side. (Pl. 45.)

325. ***AT WILL, CHANGE HANDS:*** Each rider changes hands will by any one of the methods described, or by a counter-arch.

326. ***ON THE CIRCLE:*** The section follows the leading rider ito the circle from the next ***point of the circle.*** The ***points of e circle*** are those points at which the large circle in the end the school is tangent to the end quadrilateral, or, in the hool described, to the half track. (Pl. 45.) To put the section two circles, the instructor designates a leading rider for the cond circle and commands: ***ON TWO CIRCLES.*** This com-and is given after the leading rider has passed the center of long side, and each leading rider then takes the circle at the xt ***point of the circle.***

To put the section again on the track: ***TAKE THE TRACK.*** ie leading rider of the first circle changes to the track at the xt point of the circle thereon. The leading rider of the second 'cle conducts his circle by the shortest route, without change cadence or gait, and joins on to the first circle at the proper stance.

To inscribe a circle the rider should have in mind a quadri-teral having its four corners at the four points of the circle. If e rider will then round out each one of these sides when riding om ***point*** to ***point*** he will use his aids to better advantage and scribe the circle more accurately than if he purposely tried to le a circle.

327. ***CHANGE CIRCLES:*** The leading rider, just before reach-g the point in the open school, passes diagonally across to the 'cle in the outer end of the school; thus a change of circles also a change of hands. (Pl. 46.) If the section is riding two circles, the leaders give way to the left when changing om the left to the right hand and to the right when changing om the right to the left hand.

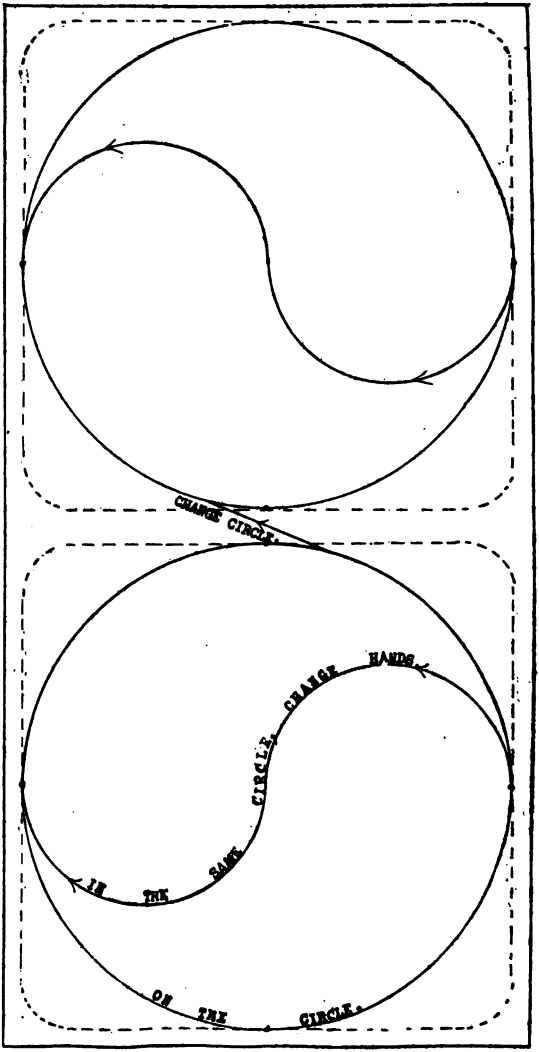


PLATE 46.

328. ***IN THE SAME CIRCLE, CHANGE HANDS:*** The leading ider turns toward the center of the circle from the ***point*** just efore the open side. The change of set is accomplished at the enter of the circle. (Pl. 46.)

329. Being on the circle, to diminish or enlarge the circle: ***IMINISH THE CIRCLE,*** or, ***TO (SO MANY) YARDS DISTANCE, IMINISH THE CIRCLE:*** Each rider, keeping his horse at the ame cadence, individually diminishes the circle by riding a piral toward the center of the circle until a distance of 1 yard r the prescribed distance has been obtained.

ENLARGE THE CIRCLE: Each rider individually enlarges the ize of the circle by approaching the original arc of the circle on spiral track, being careful to maintain the forward movement. Each rider must enlarge or diminish the size of the circle individually and not follow the track of the leading or preceding ider. Each rider will therefore describe an individual spiral rack toward the center of the circle or back to the circumference f the original circle, as the case may be.

330. Being on the track, ***ALTERNATE TRACK AND CIRCLE:*** he command is given when the leading rider approaches the econd corner of a short side. At the next point of the circle he rider takes the track or the circle as he may elect. The ollowing riders on reaching this point take either circle or rack according to whether the preceding rider has taken track r circle. Those who take the circle make one complete round nd repeat the exercise. The movement is continued until the ommand ***TAKE THE TRACK.***

331. Being on the track, 1. ***VOLT,*** 2. ***MARCH.*** Each rider ndividually describes one complete circle tangent to the track, ith a radius of 3 yards, and retakes the track at the point here he quitted it. (Pl. 43.)

As the individual circle in a one-track movement, which epresents the highest degree of curvature which is possible to equire of the ordinary schooled horse without damage to gait or adence, the instructor indicates a suitable larger radius when orking with recruits or green horses, or when working at xtended gaits. The marks on the walls of the school serve as

guides to the men in describing their circles with the proper diameter.

Having counted three from front to rear, if the command be 1. ***Nos. 1 (2 or 3);*** 2. ***VOLT,*** 3. ***MARCH,*** each No. 1 makes the volt and rejoins the column by taking the place vacated by the next No. 1 in his rear.

332. Being on the track to either hand, 1. ***Countermarch,*** 2. ***MARCH.*** At the command ***march,*** each rider leaves the track on the arc of a half circle, whose radius is 3 yards. From the outer point of the semicircle he executes an oblique back to the track. (Pl. 43.)

The same precautions as to cadence and execution mentioned for the volt apply also to the countermarch.

If it is desired to execute the countermarch successfully from the head of the column, the instructor commands: 1. ***By file,*** 2. ***From the corner,*** 3. ***COUNTERMARCH.*** The leading rider on reaching the corner at the end of a long side turns through it, continues his turn to th half-circle point, and from there obliques back to and takes the inside track in the opposite direction.

333. Being on the track to either hand, ***BROKEN LINE (SO MANY) TIMES:*** The command is given when the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner or turn. In riding a broken line, the rider changes direction obliquely into the center of the school, and then back again to the track. While riding the length of the school he repeats this the number of times ordered in the command. (Pl. 47.) The number of breaks ordered depends upon the length of the school and the stage of training of rider or horse. The length of each oblique depends upon the number of breaks ordered.

334. Being on the track to either hand, ***SERPENTINE (SO MANY) TIMES:*** The command is given as the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner. It consists of a series of incomplete circles or loops. (Pl. 47.) It is of value in quieting horses and in teaching men the frequent change of

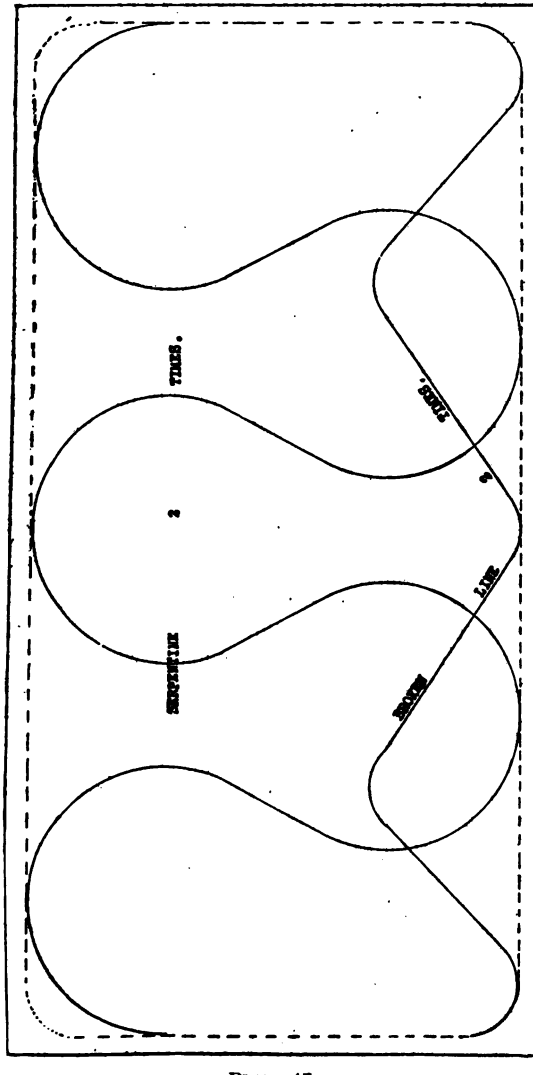


PLATE 47.

aids to change direction. Each rider must be careful not to c the curve but to ride it out fully.

335. ***ON THE FIGURE 8:*** The figure may be executed an where and may be of any size. It is always larger for u trained horses or riders. It is most accurately and easily mad along a short side. It is begun after passing through the se ond corner of a short side, the first circle being described t the same hand as the rider's original direction. The secon circle is described to the opposite hand.

The two loops should be perfect circles tangent at the comm point opposite the center of the short side. (Pl. 43.) This the point at which the change of set or bend is made. Figu 8's are made during individual riding and at collected ga only. The frequent change of bend in this movement makes a capital lesson for both rider and horse.

Work by Threes.

336. Most of the riding-school exercises above prescrib can be executed in groups of three, either individually or c lectively. For example, being in column and counted off threes from front to rear: 1. ***Threes, right about,*** 2. ***MARC*** Each No. 1 in the column, followed by his No. 2 and No. executes a right about. If the command were: 1. ***By thre right about,*** 2. ***MARCH,*** the leading Nos. 1, 2, and 3 would sim taneously execute an individual about. The next group of thre would advance to the same ground and execute the same mo ment, and so on throughout the column.

Other commands are: 1. ***Threes, circle right (countermarch column right),*** 2. ***MARCH;*** and, 1. ***By threes, by the right fla (countermarch*** or ***right oblique),*** 2. ***MARCH.*** The former indica a successive execution by each man within his set of thr acting as a unit, all the sets of threes executing the moveme simultaneously. The latter indicate a successive movement each set of threes and a simultaneous execution by each mem of a set as it arrives on the ground where the leading set be the movement. (Pl. 48.)

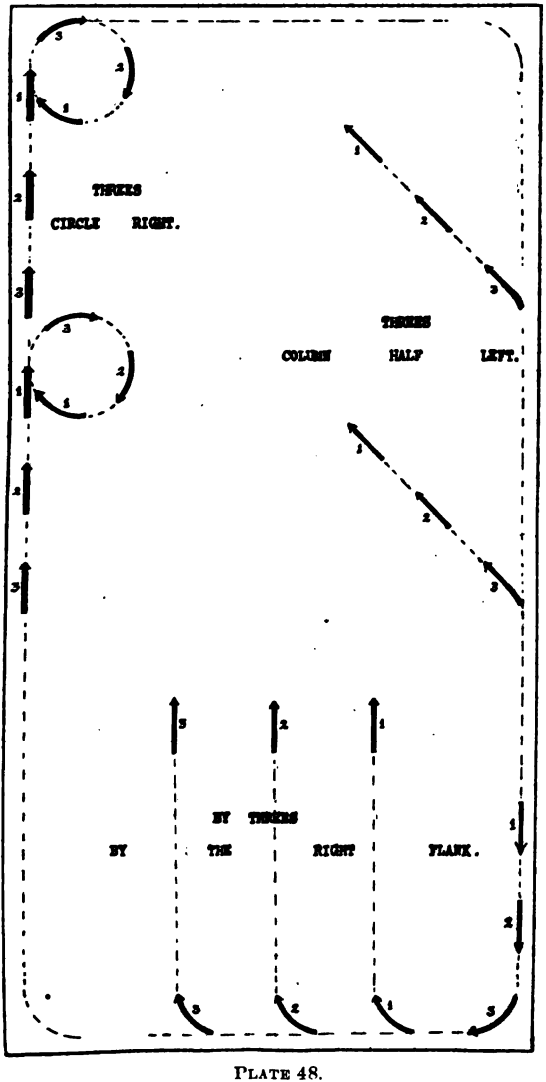

THREES
CIRCLE RIGHT.
THREES
COLUMN HALF LEFT.
BY THREES
BY THE RIGHT FLANK.

PLATE 48.

also looked upon as a gymnasium for training and school horses, for promoting their physical development, improv their balance and gaits, and confirming their obedience to t aids. However, whether the object be the training of rider horse, there must be a judicious interchange of work in t school, in the outside rectangle of large dimensions, and wo on the road and over varied terrain.

In order to teach the application of the aids or to confi obedience thereto, it is absolutely necessary for the rider prescribe accurately the path on which his horse is to mo If this is not done the rider becomes careless and inattenti while his horse soon acquires bad habits, shows lack of obe ence and slouchiness of gaits and manner, and the great bene to be derived from work in the school are lost. The most v able means of counteracting this tendency is to place dist tive marks on the walls of the school, these serving as points direction upon which the rider can guide his horse and execute the movements or figures with almost geometric curacy. These marks should be at a sufficient height to en every man in the section, even when covering in column, see them.

The sides of the riding school are called the long and sh A good proportion is two to one. A favorable size is 32 b yards. This is sufficiently and conveniently large for a sec of 20 men, and in case of necessity can be used for one c men. The points at which to place the distinctive mark a school of these dimensions are shown in plate 45.

In a riding school, unless otherwise indicated, the men at a distance of one horse length, and in passing the rule give way to the right except as specified in paragraph 327.

Exercises.

317. The following exercises, though especially good, not the only ones that may be employed. The instructor supplement them by others, always bearing in mind that exercise employed should be for some definite object and sh be looked upon merely as a means to an end. It is of ad

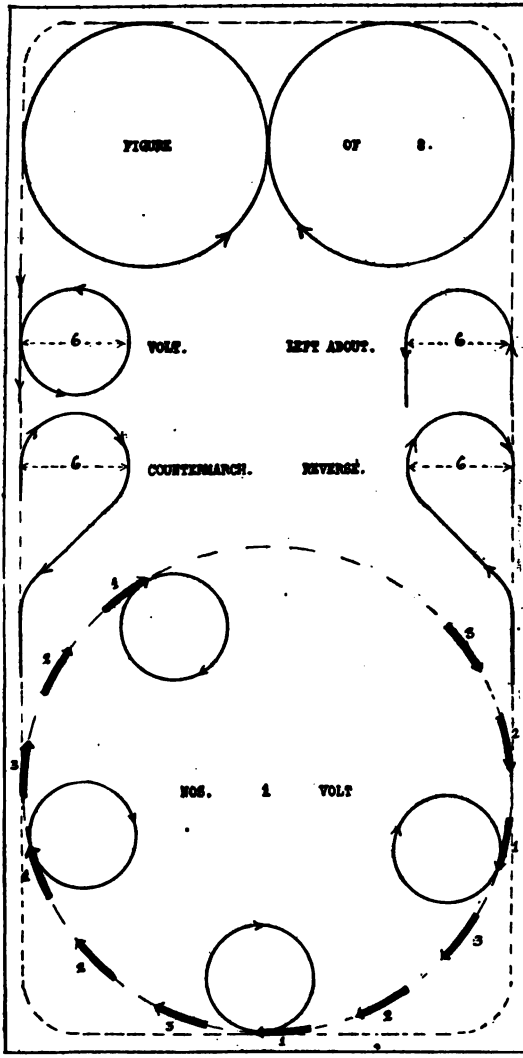


FIGURE
OF
8.
6
VOLT.
LEFT ABOUT.
6
6
COUNTERMARCH.
REVERSE.
6
1
2
3
2
3
NOS.
1
VOLT
1
2
3
2
3
1

PLATE 43.

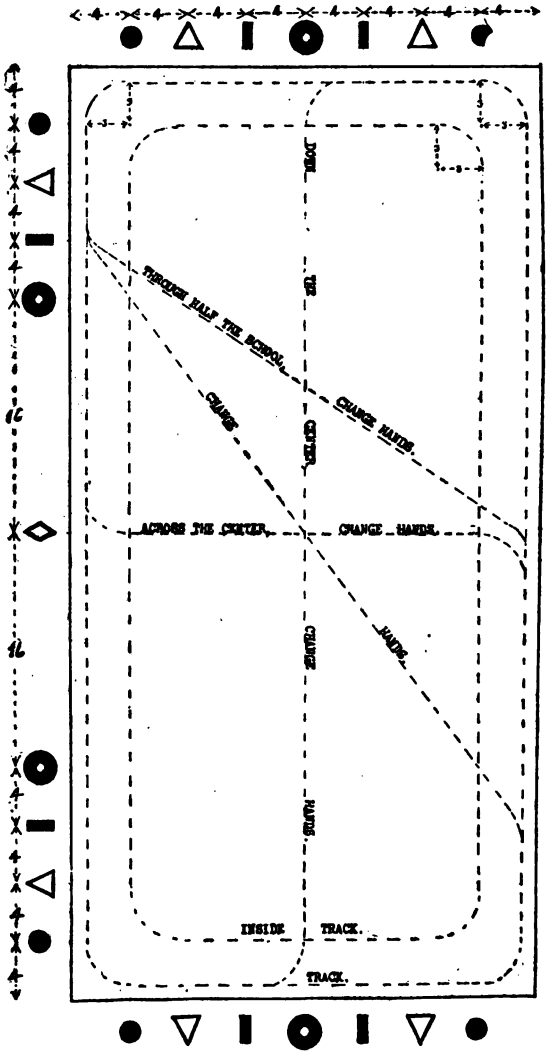

THROUGH HALF THE SCHOOL
CHANGE HANDS
CHANGE
ACROSS THE CENTER
CHANGE HANDS
CHANGE
HANDS
INSIDE TRACK.
TRACK.

PLATE 45.

The execution of this command places the men in line boot to ot. Should the instructor desire the interval other than this precedes the above command with: *At (so many) lengths (or ds) interval.*

345. 1. *On right (left) into line,* 2. *MARCH,* 3. *Squad,* 4. *HALT.* Executed as in the preceding paragraph except that each an successively turns to the right when 1 yard *beyond* the int where the preceding man began his turn. Should the structor desire an interval other than that of boot to boot, precedes the above command with: *At (so many) lengths (or rds) interval.*

To Form Column of Twos from Column of Files.

346. Being in column of files at the halt, or marching at the alk: 1. *Form twos,* 2. *Right (left) oblique,* 3. *MARCH.* The leading man moves one horse length to the front and halts. The cond man obliques to the right until uncovered, when he arches straight to the front and halts boot to boot abreast of e first man. The third man closes to 1 yard from head to oup on the first man, the fourth man obliques to the right, id so on down the column, each man looking ahead in sufficient me to avoid obliquing out of the column if he is to become the ft man in a set of twos.

If marching at the trot or at the walk and the command be ot, the leading man moves at a walk. The men in rear continue at, or take up, the trot, each one taking the walk as he eaches his place in column of twos.

To Form Column of Files from Column of Twos.

347. Being in column of twos at the halt: 1. *Right (left) by le,* 2. *MARCH.* The right man of the leading two moves traight to the front. The man on his left holds his horse traight until the first man has passed him, when he executes *ight oblique* and follows at one horse length from head to croup. Each of the other twos breaks in the same manner as soon as the left man of the preceding two commences to oblique.

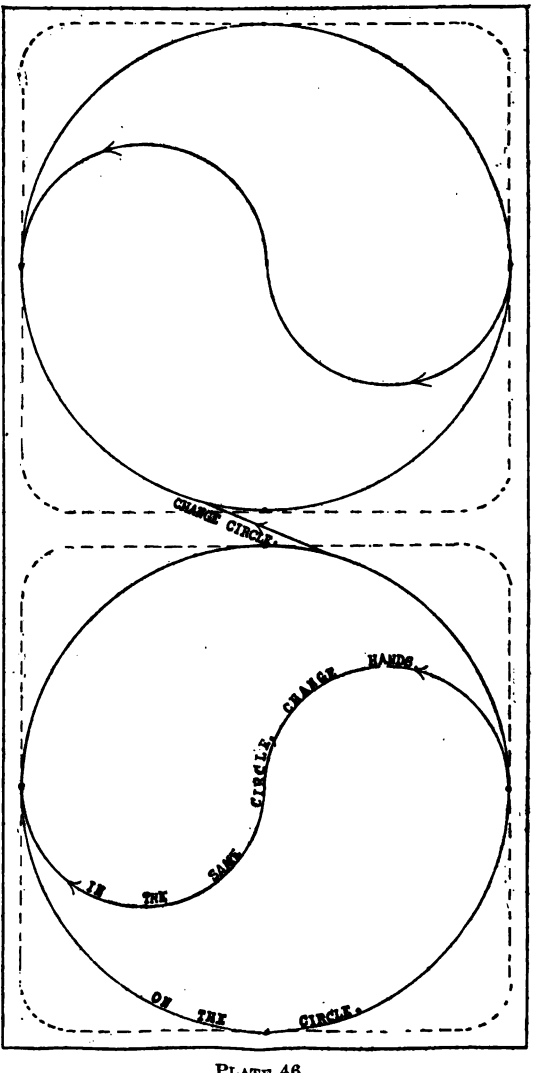


PLATE 46.

328. ***IN THE SAME CIRCLE, CHANGE HANDS:*** The leading rider turns toward the center of the circle from the ***point*** just before the open side. The change of set is accomplished at the center of the circle. (Pl. 46.)

329. Being on the circle, to diminish or enlarge the circle: ***DIMINISH THE CIRCLE,*** or, ***TO (SO MANY) YARDS DISTANCE, DIMINISH THE CIRCLE:*** Each rider, keeping his horse at the same cadence, individually diminishes the circle by riding a spiral toward the center of the circle until a distance of 1 yard or the prescribed distance has been obtained.

ENLARGE THE CIRCLE: Each rider individually enlarges the size of the circle by approaching the original arc of the circle on a spiral track, being careful to maintain the forward movement.

Each rider must enlarge or diminish the size of the circle individually and not follow the track of the leading or preceding rider. Each rider will therefore describe an individual spiral track toward the center of the circle or back to the circumference of the original circle, as the case may be.

330. Being on the track, ***ALTERNATE TRACK AND CIRCLE:*** The command is given when the leading rider approaches the second corner of a short side. At the next point of the circle the rider takes the track or the circle as he may elect. The following riders on reaching this point take either circle or track according to whether the preceding rider has taken track or circle. Those who take the circle make one complete round and repeat the exercise. The movement is continued until the command ***TAKE THE TRACK.***

331. Being on the track, 1. ***VOLT,*** 2. ***MARCH.*** Each rider individually describes one complete circle tangent to the track, with a radius of 3 yards, and retakes the track at the point where he quitted it. (Pl. 43.)

As the individual circle in a one-track movement, which represents the highest degree of curvature which is possible to require of the ordinary schooled horse without damage to gait or cadence, the instructor indicates a suitable larger radius when working with recruits or green horses, or when working at extended gaits. The marks on the walls of the school serve as

guides to the men in describing their circles with the proper diameter.

Having counted three from front to rear, if the command be 1. ***Nos. 1 (2 or 3);*** 2. ***VOLT,*** 3. ***MARCH,*** each No. 1 makes the volt and rejoins the column by taking the place vacated by the next No. 1 in his rear.

332. Being on the track to either hand, 1. ***Countermarch,*** 2. ***MARCH.*** At the command ***march,*** each rider leaves the track on the arc of a half circle, whose radius is 3 yards. From the outer point of the semicircle he executes an oblique back to the track. (Pl. 43.)

The same precautions as to cadence and execution mentioned for the volt apply also to the countermarch.

If it is desired to execute the countermarch successfully from the head of the column, the instructor commands: 1. ***By file,*** 2. ***From the corner,*** 3. ***COUNTERMARCH.*** The leading rider on reaching the corner at the end of a long side turns through it, continues his turn to th half-circle point, and from there obliques back to and takes the inside track in the opposite direction.

333. Being on the track to either hand, ***BROKEN LINE (SO MANY) TIMES:*** The command is given when the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner or turn. In riding a broken line, the rider changes direction obliquely into the center of the school, and then back again to the track. While riding the length of the school he repeats this the number of times ordered in the command. (Pl. 47.) The number of breaks ordered depends upon the length of the school and the stage of training of rider or horse. The length of each oblique depends upon the number of breaks ordered.

334. Being on the track to either hand, ***SERPENTINE (SO MANY) TIMES:*** The command is given as the leading rider approaches the first corner of a short side, and the movement is begun after riding through the next corner. It consists of a series of incomplete circles or loops. (Pl. 47.) It is of value in quieting horses and in teaching men the frequent change of

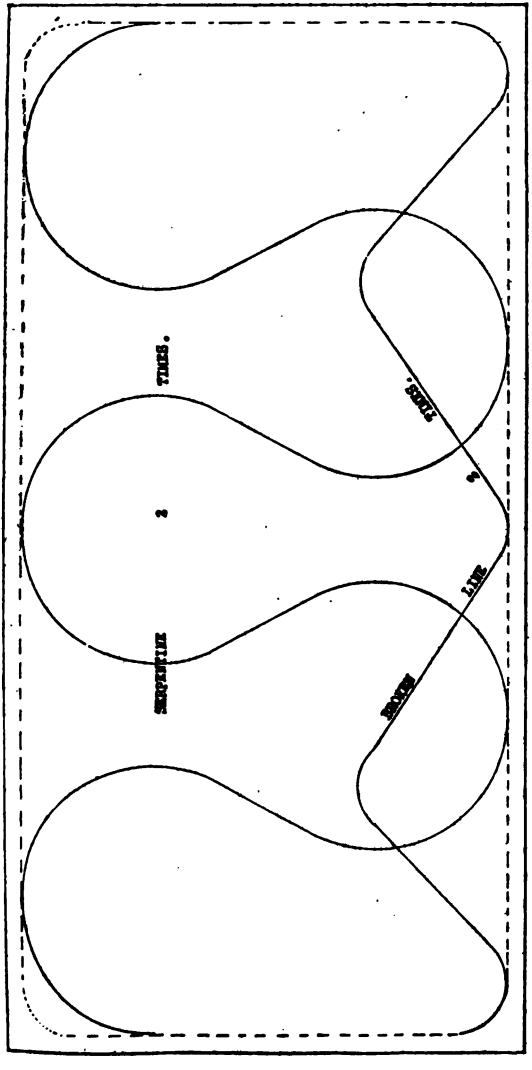


PLATE 47.

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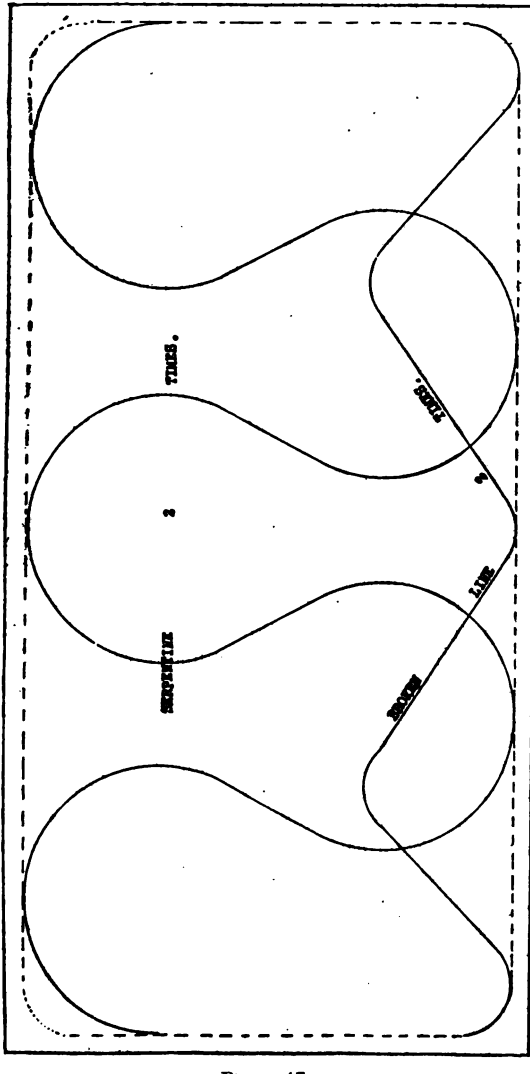

PLATE 47.

maintain the body in a position about perpendicular to the horse's back.

Riders should be practiced in crossing a V-shaped ditch, about 18 feet wide and 10 feet deep, so that they go down one side and up the other. This is a valuable exercise, as no horse will face the opposite bank unless his head is left free.

Long, steep slopes should be ascended slowly and quietly, and when the top is reached the rider should dismount and permit his horse to blow.

All slopes should be descended directly; short, steep slopes should be ascended directly; long slopes may be ascended obliquely if the surface is not slippery.

In difficult ground the horse should be allowed to take the initiative; his instincts are a more reliable guide than the aid of the rider.

If marshy ground must be crossed, go slowly and avoid following in trace. If the horse goes down and becomes nervous and begins to plunge, dismount and lead.

The rider must learn to seek every means to spare his horse, especially when carrying a pack. In particularly difficult places he should dismount and lead.

The instructor gives the men much practice in riding across ditches and ravines, such as might be encountered in draft. He impresses them with the necessity of confirming the horses in crossing such places willingly, quietly, with even gait, and with no tendency to jump.

360. Advantage is taken of the work during this period to teach the men how to cover distances at the different rates of speed as employed by couriers and artillery scouts and agents. The rates of speed prescribed for this duty are ***ordinary,*** about 5 miles per hour; ***rapid,*** 7 to 8 miles per hour; and ***urgent,*** the highest speed consistent with certainty of arrival at destination. The men must be taught that the condition of the horse, the weather, and the state of the roads may make it necessary to diverge considerably from the speed ordered. The messenger must get his horse through. In peace this must be done with

t injury to the animal; in war it may be necessary to do it the cost of fatally exhausting him.

The messenger rides the regulation gaits unless these are anifestly unsuited to his horse, in which case he rides at each iit, the tempo best suited to preserve the animal's strength.

The following variations in gaits are suggested as affording uides by which the various rates of speed may be ridden. In ach case it is assumed that the horse is in condition, and that e has been warmed up by gentle exercise, and is therefore eady for increased effort.

Ordinary: Alternate 5-minute walk periods with 10-minute ·ot periods, and rest for the last 10 minutes in each hour. This, t the regulation gaits, gives 5½ miles per hour, and with alternate walk and trot periods of these lengths, the number of inutes of travel always closely approximates the number of enths of miles covered. Thus after riding 18 minutes the messenger has covered 1.8 miles.

Rapid: Alternate 5-minute walk periods with 10-minute gallop periods, and rest for the last 10 minutes in each hour. This, it the regulation gaits, gives 7½ miles per hour.

Urgent: Combine walk, trot, gallop, or extended gallop periods as the particular case demands and as seem best adapted to save the horse. The longer the distance to be covered, the less must be the rate in miles per hour. Thus a horse of good breeding and in hard condition may be expected to cover 15 miles in one hour, while if the distance to be traversed is 30 miles, he should be given at least four hours if injury is to be avoided.

Similarly, the horse should not be pushed to his extreme speed unless the distance is very short.

Whether the speed to be ridden be *ordinary, rapid,* or *urgent,* the messenger at all halts must dismount and slightly loosen the girth to relieve the pressure from the back and to facilitate easier and deeper breathing. Unless scouring, the animal should be permitted to graze.

Frequently when trot periods and always when gallop periods are used the rider should make it the rule to dismount and lead his horse during the walk periods. Gallop periods or trot periods,

when the rate is ordinary or rapid, should not, even for a horse in hard condition, be prolonged for more than 25 minutes without alternating with a walk period. When using the posting trot it is of little or no advantage to change diagonals during a trot period. It is easier on the horse to wait until the next trot period and then to post on the other diagonal. The messenger must endeavor to water his horse with sufficient frequency as to preclude his taking at any one time a big, heavy drink. Whenever it is possible or practicable to do so, the messenger should leave behind unnecessary articles of clothing or equipment so as to lighten to the utmost the load which his horse will have to carry. In many cases, however, it may be necessary for him to ride with full pack and also to carry food for himself and grain for his horse. The rider himself must be physically fit. A tired rider fatigues his horse very much.

Distance rides, which tax to the utmost the endurance of both horse and rider, are the supreme and final tests of horsemanship.

Miscellaneous Work.

POSTING.

361. Posting, or rising to the trot, greatly diminishes the concussion produced by the rider's weight on the back and joints of the horse. It also makes breathing easier and facilitates the impulsion from the engagement of the hind feet. It is also less fatiguing to the rider than sitting down to the trot.

Posting is habitually employed by the Field Artillery rider or driver and should be learned during this period of the instruction.

It is executed as follows: The horse moving at a trot, the rider inclines the upper part of his body forward, then supporting himself on the stirrups while maintaining the grip of the knees, he rises under the impulsion of the horse, maintaining his position detached from the saddle while the succeeding impulse is produced, again sits down in the saddle shoving his

ocks forward in doing so, and continues in this way, always ding every other impulse.

t the beginning the mechanism of posting is made easier to rider by causing him to stroke the horse's neck or to grasp ck of the mane or the pommel with either hand, thus deter- ing the forward inclination of the body.

s proper execution requires that the seat shall be raised erately; that contact with the saddle shall be resumed tly and without shock; that the full support of the stirrup btained, while keeping the lower leg steady; that the ankle t shall be supple; and that the heel shall be kept lower than toe. Above all, the rider must be supple in the loins and ex them backward.

CHANGING THE DIAGONAL IN POSTING.

82. In posting the rider is said to post on the right onal when after rising he sits down in the saddle at the ant the right fore foot comes to the ground.

is important to instruct the rider to post for a time on diagonal and then change to the other, so that the horse's will each perform the same amount of work and the chance injury from the equipment will be reduced.

the riding school the rider should always rise on the le hind foot, because this foot, in response to the inner leg is the only one that can properly place itself under the s of the horse and support the weight during the change of ction in the corners; hence to insure automatically that posting is done as much on one diagonal as on the other, riders may be required to post on the left diagonal when ng to the right hand on the track and on the right diagonal n riding to the left.

he instructor occasionally requires each rider to inform him hich diagonal he is posting.

o teach the rider to change the diagonal the instructor rts him to diminish the weight borne on the stirrups and etain his seat in the saddle for two successive beats of the se's feet instead of one, and then to rise as before.

The rider will then find himself posting on the diagonal o site to the one on which he was posting before.

PRELIMINARY FOR THE BATTERY MOUNTED.

363. To prepare recruits for their work with teams i advantageous during this period frequently to form the tion in a number of squads each composed of six or eight in column of twos simulating six or eight horse teams. Su formation is favorable for teaching the men the evolutions countered in the battery mounted and for teaching the obey signals and bugle calls. It is especially favorable teaching the relative positions of the various horses of a t during a turn such as is involved in an about or a move by the flank of an artillery carriage.

364. For horse batteries it is of advantage during period occasionally to form and maneuver the men u instruction as mounted gun squads.

CHAPTER II—THE GUN SQUAD MOUNTED.

365. The special instruction required for the cannoneer a battery of Horse Artillery embraces that of a gun s mounted and that of two or more gun squads mounted.

Composition of the Gun Squad.

366. Each *gun squad* is organized as in paragraph 1 Two of the privates act as horse holders for the cannon horses.

367. A *caisson squad* is organized as in paragraph **136.**

368. When the gun squads march or maneuver with battery each caisson corporal retains his post boot to boot the lead or swing driver of his caisson.

Formation of the Gun Squad.

369. The gun and caisson squads are formed in double r in the order prescribed in paragraphs **138** and **139** with interval of 6 inches from knee to knee, and at a distance of

d from the croups of the front-rank horses to the heads of rear-rank horses.

70. In the gun squad Nos. 6 and 7 and in the caisson squad highest numbered cannoneers in each rank act as horse ders. If there are less than six cannoneers in the squad the hest numbered cannoneer acts as horse holder, the horses ng linked in single rank.

71. The guide of the gun squad is the gunner; of the sson squad, the caisson corporal, or, in his absence, the can- ieer on the right of the front rank.

To Form the Gun Squad.

72. The instructor indicates the point where the right of squad is to be and the direction in which it is to face and mands: ***LEAD OUT.***

The gunner repeats the command and places himself where right of the squad is to rest, faced in the proper direction.

The men lead out and form in double rank, taking the posi- n of stand to horse, with intervals of 18 inches between horses; h rear-rank man places his horse at the distance of 1 yard m the croup of the horse of his front-rank man, the horses ering each other.

To Mount.

73. 1. ***Cannoneers prepare to mount,*** 2. ***MOUNT.***

Executed as explained in the Soldier Mounted (240), the can- neers mounting without moving their horses out of ranks; necessary they make them give way slightly to the right or t.

If the command be: 1. ***Cannoneers,*** 2. ***MOUNT,*** the cannoneers ecute at the command ***mount*** all that has been prescribed for e commands ***prepare to mount*** and ***mount.***

To Dismount.

74. 1. ***Cannoneers prepare to dismount,*** 2. ***DISMOUNT.***

Executed as explained in "The soldier mounted" **(245)**, e cannoneers dismounting without moving their horses out

of rank; if necessary, they make them give way slightly to the right or left.

If the command be: 1. *Cannoneers*, 2. *DISMOUNT*, they execute at the command *dismount*, all that has been prescribed for the commands *prepare to dismount* and *dismount*.

Alignments.

375. The alignments are first taught by requiring the cannoneers to align themselves upon two files established as a base.

The squad being in line at a halt, the instructor causes the first two files on the flank toward which the alignment is to be made to move forward a few steps and establishes them as a base; he then commands: 1. *By file*, 2. *Right (Left)*, 3. *DRESS*, 4. *FRONT*.

At the second command each man of the file on the right gathers his horse and at the command *dress* moves forward; when near the line each man slackens the gait, moves up slowly, casts his eyes to the right so as to see the buttons on the breast of the second man from him, sits squarely on his horse, keeps his horse straight in ranks, and touches lightly with his stirrup the stirrup of the man on his right. The other men dress in the same manner, each moving off when the preceding man halts.

The instructor verifies the alignment and gives the command *front* when the last man is aligned, at which command all cast their eyes to the front. All movement in the ranks must then cease.

The instructor observes in the alignment: That each man gathers his horse at the proper time; that he moves his horse steadily and keeps him square to the front; that he sits squarely on his horse and dresses promptly as he arrives on the line; that he does not lean his head or body to the front or rear; that he keeps the proper interval, touching lightly the stirrup of the man on his right; that he relaxes the reins and legs as soon as he has dressed.

376. In the first drills the basis of the alignment is established parallel to the front of the squad, and afterwards in oblique directions.

77. The cannoneers having learned to align themselves
i by man, the instructor establishes the basis of alignment
before and aligns the squads by the commands: 1. *Right*
t), 2. *DRESS,* 3. *FRONT.*
t the command *dress* all the men except the base files move
ward and dress up to the line.
78. Alignment to the rear is executed on the same prin-
es; the instructor commands: 1. *Right (Left) backward,* 2.
SS, 3. *FRONT.*
ll the men, except the base files, rein back, keeping their
ses straight, halt in line with, or a little in rear of the base,
immediately dress up to the line.

The Rests.

79. Executed as prescribed in "The soldier mounted"
58).

To Fall Out.

80. The squad being in line dismounted: 1. *By the right*
t), 2. *FALL OUT.*
The front rank man on the right followed by the man behind
i leads his horse 1 yard straight to the front and then directly
the stable or picket line. Each of the other front-rank men
cutes the same movement so as to follow the horse of the
r-rank man next on his right at a distance of 1 yard.

To Dismiss the Squad.

81. Executed as prescribed in "The Soldier Mounted"
59).

To March in Line.

82. Being in line at a halt: 1. *Forward,* 2. *MARCH.*
The squad moves off promptly, the guide marching straight
the front at the regular gait.
The instructor observes that the squad marches straight to
front at the regular gait; that the men keep their horses

straight in ranks; that they maintain the proper interval fr the side of the guide; that they yield to pressure from that s and resist pressure from the opposite direction; that w habitually keeping the head to the front, they occasion glance toward the guide; that if in advance they rein in gra ally; that if in rear they gradually increase the gait until t alignment is regained.

The instructor will impress upon the men that the alignm and interval can be preserved only by uniformity of gait by keeping the horse straight in the line of direction.

To call attention to the loss of alignment or interval instructor commands: ***DRESS.*** At this command the glance toward the guide and then make the necessary correcti

383. Marching in line, to effect a slight change of directi *Incline to the right (left).*

The guide turns his horse slightly to the right and marches the new direction; the other men gradually conform to movements of the guide, increasing or diminishing the gait cording as the change is toward or opposite the side of the gui

To Halt.

384. 1. *Squad,* 2. ***HALT.***

To Rein Back the Squad.

385. Being in line at a halt: 1. ***Backward,*** 2. ***MARCH.***

All the men rein back, dressing on the guide.

This movement is used for short distances only.

To Oblique in Line.

386. 1. ***Right (Left) oblique,*** 2. ***MARCH.***

At the command *march* each man obliques to the right (305 his right knee in rear of the left knee of the man on his rig The squad moves in the new direction, regulating by the rig in a line parallel to the original front.

If the command *halt* be given while marching obliquely t men halt faced in the direction in which they were marching.

To resume the oblique march: 1. *Forward*, 2. *MARCH*.
While obliquing, to resume the march in line: 1. *Left (Right) que*, 2. *MARCH*.

To Turn and Halt.

387. Being in line: 1. *Squad right (left)*, 2. *MARCH*, 3. *FRONT*.
At the command *march* the front-rank man on the right exe-es by the right flank and halts; each of the other men turns horse to the right, approximating the oblique and moving the shortest line without changing the speed, places himself east of the pivot man. The rear-rank men conform to the vement of the front rank and place themselves, covering their leaders at a distance of 1 yard. All dress to the pivot with-command.
The instructor verifies the alignment from the pivot.
quad half right (half left) is executed in the same manner; pivot makes an oblique to the right.

To Turn and Advance.

388. Being in line at the halt or at the walk: 1. *Right (Left)* n, 2. *MARCH*.
The front-rank man on the right executes by the right flank l moves forward in the new direction without increasing the ed; each of the other men turns his horse to the right, ap-ximating the oblique, and, moving at the trot by the shortest e, places himself abreast of the pivot man, when he takes gait and direction of the latter. The rear-rank men con-m to the movements of the front rank and place themselves, ering their file leaders at a distance of 1 yard. During the n the guide is, without command, on the pivot flank; the ginal guide is resumed without indication as soon as the n is completed.
If marching at the trot the pivot man continues at the trot, ch of the others slightly increases his speed until he arrives the line.

If marching at the gallop the execution is similar, the pivot man continues at the gallop, each of the others slightly increasing his speed until he arrives on the line.

Right (Left) half turn is executed on the same principles; the pivot man makes an oblique to the right.

The About by Squad.

389. Being in line: 1. *Squad right (left) about,* 2. *MARCH.*

Executed as in paragraph 387, except that the turn is through an arc of 180°.

To March by the Flank from Line.

390. Being in line at a halt: 1. *By the right (left) flank,* 2. *MARCH.*

The front and rear rank cannoneers on the right simultaneously execute by the right flank; each rear-rank cannoneer after completing the turn, closes in so as to ride boot to boot with his front-rank man. The movement is taken up successively by the other cannoneers in time to follow the two next on the right at a distance of one yard.

If marching, the men on the flank toward which the movement is made execute the turn at the command *march;* the others halt and then turn in succession.

391. The squad having been marched by the flank is now in flank column. Each cannoneer should so conduct his horse that the man of his rank who immediately precedes him shall hide all the other men in his front.

To Form Line to the Right or Left from Flank Column.

392. 1. *Right (Left) into line,* 2. *MARCH,* 3. *Squad,* 4. *HALT,* 5. *FRONT.*

Executed as in "The Soldier Mounted" (344), each rear rank man checking his horse so as to follow his front-rank man. If the command *halt* is given at any time after the leading file has advanced its own length in the new direction. The other files

ess as they arrive on the line and take the prescribed interval
69); the instructor places himself near the right to superin-
id the movement and gives the last command when all are
gned.

The instructor commands *left (right) into line*, according as
e flank column is right or left in front.

393. The flank column is *right in front* when the front-rank
en are on the left of the rear-rank men; the column is *left in*
nt when the front-rank men are on the right of the rear-rank
en.

To Oblique in Flank Column.

394. 1. *Right (Left) oblique*, 2. *MARCH.*

To resume the oblique after halting: 1. *Forward*, 2. *MARCH.*

To Change Direction in Column of Twos.

395. 1. *Column right (left)*, 2. *MARCH.*

Executed as in "The Soldier Mounted" (350).

Maneuvers of Two or More Squads.

396. If it is desired to train two or more gun squads mounted
the formations and movements laid down in the Gun Squad
ounted, the squads are maneuvered by the same commands and
eans as those prescribed for a single squad, with obvious modi-
ations.

To Lead Out.

397. The cannoneers lead out by squads in the order of the
umbers of their sections. At the command *lead out* by the
structor or senior noncommissioned officer present, the can-
oneers of the first section lead out as already explained; the
ading cannoneer of each of the squads moves off in time to
llow the last cannoneer of the preceding squad and places his
orse 15 yards to the left of the front-rank horses of his squad.
' desired, this interval may be diminished.

To Post the Squads at Their Carriages.

398. The squads are marched to the park in flank colum or column of squads; each gunner, on arriving near the par marches his squad to its carriage and posts it in its position.

To Leave the Park.

399. The squads are marched by the flank as prescribed fo a single squad mounted; the rear squads, if necessary, take th trot at command of their gunners in order to close up to th proper distance.

CHAPTER III.—THE DRIVER.

SECTION I.—OBJECT AND SEQUENCE OF THE INSTRUCTION.

400. The object of this instruction is the training of th Field Artillery driver:

(*a*) In harnessing and unharnessing and in the proper fitting cleaning, and care of harness.

(*b*) In managing and maneuvering a single pair.

(*c*) In managing and maneuvering the different pairs of t team in draft.

In the instruction of recruits quiet, well-trained horses wi be used.

401. In order to secure and maintain interest, and in orde that the work may completely cover the subject it is of impor tance that the instructor adhere to a systematic and progressiv sequence of instruction.

In all driver instruction, whether it pertains to the trainin of recruits or to the specialization of men as drivers, work i equitation should be continued as a part of the daily program This instruction may properly be a review of that outline under "The Soldier Mounted," or it may be more advanced, a indicated in paragraph **210**.

402. The following subjects arranged in a proper sequenc will be covered in the training of the driver. With recruits

: *Preliminary Instruction* may be pursued as a part of their ily program during the latter part of their instruction in "The ldier Mounted." The *Mounted Instruction*, however, involving it does the handling of two horses, will not, except in case of ergency, be begun until the instruction outlined under "The ldier Mounted" has been completed.

Preliminary Instruction.

l. Terms.
2. Nomenclature of harness.
3. Disposition of harness.
4. Harnessing and unharnessing.
5. Adjustment and fitting of harness.
6. Cleaning and care of harness.
7. Rolling drivers' rolls and packing equipment on the saddle.

Mounted Instruction.

8. General provisions and miscellaneous instruction.
9. Management of the pair.
10. Teams and their management in draft.

103. Concurrently with the instruction covering these sub- ts advantage should be taken of rests during the lessons and inclement weather to lecture to the men and question them on ints relating to:

(*a*) The care, management, and conditioning of horses, hav- especial reference to the draft horse on the march and in the ld.

(*b*) Driving and draft and methods of overcoming difficulties ely to be encountered.

(*c*) The necessity for careful and constant adjustment and ting of harness and the proper care of shoulders and backs.

(*d*) The necessity for and how to obtain condition.

(*e*) The necessity for and object of horse training.

(*f*) Other useful knowledge connected with the management horses in garrison or the field.

The instructor should endeavor by every possible means to imulate the interest of the men and to excite their enthusiasm

over their work with and their knowledge of horses. This i terest and enthusiasm add to efficiency, not only in overcomi difficulties incident to transport but also in the attention a care bestowed upon the animals.

SECTION II.—THE STANDARD REQUIRED.

404. The training of the driver is largely a matter of ex perience and practice which becomes perfect only with tim However, the standard required and outlined in paragraph 2 should ordinarily be attained within three months after compl ing the work outlined under "The Soldier Mounted."

The time devoted to a single lesson should be not less th that prescribed in paragraph **224.** Often, however, the instru tion of the drivers will be held at the same time, and mus therefore, be made to fit in with the specialization of the ca noneers in their duties.

SECTION III.—PRELIMINARY INSTRUCTION.

Terms.

405. The horses assigned to a single driver are called *pair;* the horse on the left side is called the *near horse;* th other the *off horse.* The driver rides the near horse.

The pairs assigned to the traction of a single carriage a termed collectively a *team.* A team usually consists of not les than three pairs. The leading pair is called the *lead pair;* th one attached to the carriage the *wheel pair;* the pair betwee these two the *swing pair.* When there are two pairs betwee the lead and wheel pairs, the pair next behind the lead pair i called the *lead swing;* the other the *wheel swing* pair. Whe there are five pairs the one between the lead swing and th wheel swing is called the *middle swing* pair.

Nomenclature of Harness.

406. The instructor, using a harnessed pair or a hitched team, points out the different parts of the harness, explains the

ocks forward in doing so, and continues in this way, always
ding every other impulse.

the beginning the mechanism of posting is made easier to
rider by causing him to stroke the horse's neck or to grasp
k of the mane or the pommel with either hand, thus deter-
ng the forward inclination of the body.

s proper execution requires that the seat shall be raised
erately; that contact with the saddle shall be resumed
ly and without shock; that the full support of the stirrup
btained, while keeping the lower leg steady; that the ankle
t shall be supple; and that the heel shall be kept lower than
toe. Above all, the rider must be supple in the loins and
ex them backward.

CHANGING THE DIAGONAL IN POSTING.

82. In posting the rider is said to post on the right
onal when after rising he sits down in the saddle at the
ant the right fore foot comes to the ground.

is important to instruct the rider to post for a time on
diagonal and then change to the other, so that the horse's
will each perform the same amount of work and the chance
njury from the equipment will be reduced.

n the riding school the rider should always rise on the
de hind foot, because this foot, in response to the inner leg
is the only one that can properly place itself under the
s of the horse and support the weight during the change of
ction in the corners; hence to insure automatically that
posting is done as much on one diagonal as on the other,
riders may be required to post on the left diagonal when
ng to the right hand on the track and on the right diagonal
n riding to the left.

he instructor occasionally requires each rider to inform him
which diagonal he is posting.

o teach the rider to change the diagonal the instructor
cts him to diminish the weight borne on the stirrups and
retain his seat in the saddle for two successive beats of the
se's feet instead of one, and then to rise as before.

collars, one in each end of the sack; bridles, one inside of ea collar; traces looped around and outside of the collars; bl kets, one on each collar; saddles, one on each blanket. T harness sack is securely tied and is tagged to show (1) the p in the team, (2) the carriage, (3) the section.

When harness sacks are not taken, each horse's harness m be packed in a grain sack and appropriately tagged.

Harnessing and Unharnessing.

410. In the training of recruits the men are first permit to watch the instructor or an assistant perform in detail all t various steps in harnessing and unharnessing, during the pr ress of which every point is carefully explained to them. Af this, the instructor calls upon the recruits in turn to perfor single detail of the harnessing or unharnessing, as in this w they are enabled to observe and profit from each other's m takes. A pair of quiet, well-trained horses in a double stall then assigned to each recruit to harness and his work is ca fully supervised by the instructor or an assistant.

To avoid striking, frightening, or spoiling the horses the m are impressed with the necessity of working about them gen and quietly and of handling the harness carefully.

To Harness.

411. The harness being on the heel posts, the instruc causes the men to *stand to heel* (**226**); and commands: 1. *detail*, 2. *HARNESS*.

Collar.—At this command each driver puts on and locks t collar of his off horse, then that of his near horse. To avo pinching and clamping a portion of the skin or mane between t collar and the collar pad, the collar is placed well up on the nec locked, and then lifted gently to its position against the sho ders. By stooping down and looking at it, the driver shou satisfy himself that the buckle latch is securely locked.

Saddle.—He puts on the blanket of the off horse, then th saddle with its attachments, taking care not to displace th blanket; buckles the collar strap to the saddle; turns back th

l from the croups of the front-rank horses to the heads of rear-rank horses.

70. In the gun squad Nos. 6 and 7 and in the caisson squad highest numbered cannoneers in each rank act as horse lers. If there are less than six cannoneers in the squad the iest numbered cannoneer acts as horse holder, the horses ig linked in single rank.

71. The guide of the gun squad is the gunner; of the ison squad, the caisson corporal, or, in his absence, the can-eer on the right of the front rank.

To Form the Gun Squad.

72. The instructor indicates the point where the right of squad is to be and the direction in which it is to face and mands: ***LEAD OUT.***

he gunner repeats the command and places himself where right of the squad is to rest, faced in the proper direction.

he men lead out and form in double rank, taking the posi-1 of stand to horse, with intervals of 18 inches between horses; h rear-rank man places his horse at the distance of 1 yard m the croup of the horse of his front-rank man, the horses ering each other.

To Mount.

373. 1. ***Cannoneers prepare to mount,*** 2. ***MOUNT.***

Executed as explained in the Soldier Mounted (240), the can-ieers mounting without moving their horses out of ranks; necessary they make them give way slightly to the right or t.

f the command be: 1. ***Cannoneers,*** 2. ***MOUNT,*** the cannoneers ecute at the command *mount* all that has been prescribed for commands ***prepare to mount*** and ***mount.***

To Dismount.

374. 1. ***Cannoneers prepare to dismount,*** 2. ***DISMOUNT.***

Executed as explained in "The soldier mounted" **(245)**, e cannoneers dismounting without moving their horses out

horse, and draws the martingale through the standing l on the cincha; then does the same with respect to the off hor unhooks the inside end of each breast strap, detaches the n yoke, and hangs it on its spike.

Uncouple.—Each driver steps in front of his pair and t couples. If the horses are facing the stable driveway, he tu them about to face the manger.

Unbridle.—He unbridles (235) the near horse, puts the hal on, fastens the halter to the manger, and hangs the bridle on t upper peg next the heel post. He then unbridles the off ho in like manner.

Traces off.—He disengages the near trace of the near h and lays its middle over the saddle, toggle on the near s disengages the off trace and lays it beside the near trace, to on the off side; removes the traces and hangs them on their p In like manner he removes and hangs up the traces of the horse.

Unsaddle.—He unfastens the crupper of the near horse places the attachments in the saddle; unfastens the collar st and then unsaddles the near horse (229), placing the sad on the lower peg. He removes the blanket from the near ho and places it over the saddle, the folded edge away from t heel post. He then unsaddles the off horse in like manner.

Collar off.—He removes the collar of the near horse, then th of the off horse, and hangs them up, the near collar next to t post, the zinced surfaces away from the heel post.

414. To unharness without detail: *UNHARNESS.*

To Harness and Unharness in the Field.

415. Executed as in garrison, but in such order as to s the disposition of the harness. Thus, the order in harnessi is: *Collar, bridle, saddle, traces, couple, yoke.* In unharnessin *Unyoke, uncouple, traces off, unsaddle, unbridle, collar off.*

While harnessing and unharnessing, the horses are ordinari tied by their halters to their carriages, as follows: The le pair to the right wheel of the gun or caisson or to the end

[7. The cannoneers having learned to align themselves by man, the instructor establishes the basis of alignment efore and aligns the squads by the commands: 1. *Right*), 2. *DRESS*, 3. *FRONT*.

: the command *dress* all the men except the base files move ard and dress up to the line.

78. Alignment to the rear is executed on the same prin- es; the instructor commands: 1. *Right (Left) backward*, 2. *SS*, 3. *FRONT*.

ll the men, except the base files, rein back, keeping their es straight, halt in line with, or a little in rear of the base, immediately dress up to the line.

The Rests.

79. Executed as prescribed in "The soldier mounted" 58).

To Fall Out.

80. The squad being in line dismounted: 1. *By the right* t), 2. *FALL OUT*.

he front rank man on the right followed by the man behind leads his horse 1 yard straight to the front and then directly he stable or picket line. Each of the other front-rank men cutes the same movement so as to follow the horse of the r-rank man next on his right at a distance of 1 yard.

To Dismiss the Squad.

81. Executed as prescribed in "The Soldier Mounted" 59).

To March in Line.

82. Being in line at a halt: 1. *Forward*, 2. *MARCH*.

The squad moves off promptly, the guide marching straight the front at the regular gait.

The instructor observes that the squad marches straight to front at the regular gait; that the men keep their horses

battery can be kept up to their work without more or less
longed periods of enforced idleness due to harness injuries.

420. The *bridle* and *saddle* are fitted as prescribed in p
graphs **230** and **234.**

The *collar* should fit about the horse's shoulders and
easily and uniformly. It should freely admit the thickne
the hand between the lower part of the collar and the th
and, when pulled to one side, should admit the thickness of
fingers between the sides of the collar and the neck. A s
collar chokes a horse by pressing on the windpipe; a nar
one pinches and rubs the neck. A broad collar works a
and galls the shoulders. More injuries result from collars
are too large than from collars that are too small.

The final test of the fit of a collar is to observe it caref
when the horse is in draft and, at halts, to notice what effe
is having on his shoulders.

After a collar has been properly fitted to a horse it shoul
marked with his battery number. This is conveniently don
painting the number just above the left draft spring on
inside of the collar.

The *back strap,* when adjusted, should admit the breadth
the hand between it and the horse's back. If too short,
crupper will cut the tail and the saddle will be displaced.

The *collar strap* should not be tight; otherwise it will pull
saddle forward on the withers.

The *surcingle,* when used, should be buckled on the near
of the near horse and on the offside of the off horse, less t
than the girth and over it.

The *hip straps* should be so adjusted as to enable the *bre
ing body* to bear flat against the thighs and to rest from 1
15 inches below the dock. If this strap hangs too low, the ac
of the horse, when set into the breeching, will be interfered w
if it hangs too high, the side straps will rub the stifle.

The *side straps* are adjusted to cause the breeching body
bear quickly should the horse be required to check the carri
but not so short as to impede the animal's movements while

o resume the oblique march: 1. *Forward*, 2. *MARCH.*
hile obliquing, to resume the march in line: 1. *Left (Right) que*, 2. *MARCH.*

To Turn and Halt.

387. Being in line: 1. *Squad right (left)*, 2. *MARCH*, 3. *FRONT.*
t the command *march* the front-rank man on the right exe-es by the right flank and halts; each of the other men turns horse to the right, approximating the oblique and moving the shortest line without changing the speed, places himself east of the pivot man. The rear-rank men conform to the vement of the front rank and place themselves, covering their leaders at a distance of 1 yard. All dress to the pivot with-command.
he instructor verifies the alignment from the pivot.
quad half right (half left) is executed in the same manner; pivot makes an oblique to the right.

To Turn and Advance.

388. Being in line at the halt or at the walk: 1. *Right (Left)* n, 2. *MARCH.*
The front-rank man on the right executes by the right flank l moves forward in the new direction without increasing the ed; each of the other men turns his horse to the right, ap-ximating the oblique, and, moving at the trot by the shortest e, places himself abreast of the pivot man, when he takes gait and direction of the latter. The rear-rank men con-m to the movements of the front rank and place themselves, vering their file leaders at a distance of 1 yard. During the rn the guide is, without command, on the pivot flank; the iginal guide is resumed without indication as soon as the rn is completed.
If marching at the trot the pivot man continues at the trot, ch of the others slightly increases his speed until he arrives the line.

The *coupling rein* should be so adjusted as to permit the horse properly to maintain his trace and yet to hold him to place in the team.

Cleaning and Care of Harness and Horse Equipment.

421. Recruits are instructed in the proper methods of cleaning and caring for harness as described in Care and Maintenance of Equipment.

Rolling Drivers' Rolls and Packing Equipment on the Saddle.

422. The articles which make up the driver's equipment and the methods of packing them are prescribed in Part VIII. Recruits must quickly learn what articles comprise their equipment, how they are packed, and that rolls poorly made and carelessly packed cause loss of or damage to equipment, sores or injuries to their horses, and discomfort and expense to themselves.

SECTION IV.—*MOUNTED INSTRUCTION.*

GENERAL PROVISIONS AND MISCELLANEOUS INSTRUCTION.

Intervals and Distances.

423. Intervals between—

Pairs in line, 1-horse length, 3 yards.

Teams in line, 1-team length, 3 yards for each pair.

Hitched carriages in line, 1 hitch-carriage length, 17 yards for a 3-pair team.

Distances between—

Pairs in column, 1 yard.

Teams in column, 2 yards.

Hitched carriages, about 2 yards, or such that, when moved by the flank, the intervals will be as above.

Other intervals and distances are as prescribed in "The Battery Mounted."

Disposition of the Carriages of a Section.

4. The carriages of a section are said to be in *section* *n* when one is in rear of the other and hitched carriage nce from it. They are ordinarily parked in this formation. ey are said to be in *flank column* when abreast of each : at the interval prescribed for hitched carriages in line; *uble section* when abreast of each other at 2 yards interval.

To Stand to Horse.

5. The driver takes the position with respect to the near e prescribed for "The Soldier Mounted" (237) and also s the coupling rein in his right hand when this is necessary erly to control the off horse. When it is held the coupling is not attached to the near saddle.

To Lead Out.

26. To form the pairs or teams after harnessing, the in- ictor indicates the order in which the drivers are to leave picket line or stable and the place and character of the for- ion, and commands: *LEAD OUT;* or, 1. *First (such) section,* *EAD OUT.* The drivers, moving in the order directed and so not to interfere with each other, lead out as explained in he Soldier Mounted" (238). When necessary to lead or ntrol the off horse the driver holds the coupling rein in the ht hand. In such a case it is not attached to the saddle of e near horse.

If the pairs are to be led at once to the carriages the in- ructor may command: 1. *To your carriages,* 2. *LEAD OUT;* or, *First (such) section,* 2. *To your carriages,* 3. *LEAD OUT.*

To Mount and Dismount.

427. Being at a halt: 1. *Drivers prepare to mount (dismount),* *MOUNT (DISMOUNT).*

Executed as prescribed in "The Soldier Mounted" (240, 45). The whip, if in hand, is hung on its ring before dis- ounting.

To Dismount the Drivers While Marching.

428. Being at a walk: 1. *Drivers,* 2. *DISMOUNT.*

Each driver dismounts without checking the gait, places bridle reins of his near horse over the pommel, and walks side him without touching the reins, unless it is necessar check his pair; if either one of his pair lags, he speaks to or touches him lightly with the whip.

If necessary to guide the carriage to a definite position driver takes the reins as in *stand to horse* and control movement.

If the instructor commands: 1. *Lead and swing drive* *DISMOUNT,* only the drivers named dismount.

To Mount the Drivers While Marching.

429. Being at a walk: 1. *Drivers,* 2. *MOUNT.*

All the drivers who are dismounted mount without chec the gait.

If the instructor commands: 1. *Wheel drivers,* 2. *MOUNT,* the drivers named mount.

Marching with the drivers dismounted will be practiced first over smooth, level ground until the teams are taught pull together and to walk with an even, regular gait.

Alignments.

430. Being in line of pairs, teams, or sections, unhitche and at a halt, the instructor sees that the driver, team, or se tion on the flank toward which the alignment is to be made in the desired position and commands: 1. *Right (Left),* 2. *Dre* 3. *FRONT.*

At the command *dress* the other drivers look to the right a align themselves accurately, keeping their pairs straight a preserving their intervals. At the command *front* they tu their eyes to the front.

The instructor may place himself on either flank and give general alignment by ordering any driver to move one or bo of his horses forward or backward.

ocks forward in doing so, and continues in this way, always
ding every other impulse.
t the beginning the mechanism of posting is made easier to
rider by causing him to stroke the horse's neck or to grasp
ck of the mane or the pommel with either hand, thus deter-
ng the forward inclination of the body.
s proper execution requires that the seat shall be raised
erately; that contact with the saddle shall be resumed
ly and without shock; that the full support of the stirrup
btained, while keeping the lower leg steady; that the ankle
t shall be supple; and that the heel shall be kept lower than
toe. Above all, the rider must be supple in the loins and
ex them backward.

CHANGING THE DIAGONAL IN POSTING.

52. In posting the rider is said to post on the right
onal when after rising he sits down in the saddle at the
ant the right fore foot comes to the ground.
is important to instruct the rider to post for a time on
diagonal and then change to the other, so that the horse's
will each perform the same amount of work and the chance
injury from the equipment will be reduced.
i the riding school the rider should always rise on the
le hind foot, because this foot, in response to the inner leg
is the only one that can properly place itself under the
s of the horse and support the weight during the change of
ction in the corners; hence to insure automatically that
posting is done as much on one diagonal as on the other,
riders may be required to post on the left diagonal when
ng to the right hand on the track and on the right diagonal
n riding to the left.
he instructor occasionally requires each rider to inform him
which diagonal he is posting.
o teach the rider to change the diagonal the instructor
cts him to diminish the weight borne on the stirrups and
ntain his seat in the saddle for two successive beats of the
se's feet instead of one, and then to rise as before.

6. In addition, if a wheel driver, to relieve the weight
the necks of his horses by properly placing the limber or
prop; on muddy roads to wipe the mud off the martingales.

To Hook Traces.

433. The teams being in column of pairs in proper or
from front to rear, the instructor commands: ***HOOK TRACES.***

Each lead and swing driver goes to the rear of his off hor
passing by his off side, and hooks the rear ends of the traces
the front ends of the corresponding traces of the pair in re
beginning with the outer trace of the off horse and ending w
the outer trace of the near horse.

To Unhook Traces.

434. ***UNHOOK TRACES:*** Each lead and swing driver backs
pair, if necessary, in order to unhook more easily. He then g
in rear of his horses, passing by the near side of his near hors
and detaches the traces of his pair, beginning with the o
trace of the near horse and ending with the outer trace of t
off horse. As each trace is unhooked it is laid over the back
the horse in rear of the saddle.

To Post the Teams with their Carriages.

435. The teams, with traces hooked or unhooked, may
marched to their carriages in column, double-section column,
other suitable formation. As they approach the carriages th
instructor commands: ***TEAMS TO YOUR CARRIAGES.*** At th
command each team proceeds by the most direct route to i
carriage, turning if necessary, and approaching it from th
right or left limber wheel. When the team reaches its prope
position the wheel driver commands: 1. ***Team,*** 2. ***HALT,*** cause
the horse nearest the pole to step over it, and places his pair fo
hitching.

To Hitch.

436. The traces being hooked: 1. ***Drivers,*** 2. ***HITCH.***

Each wheel driver dismounts, if mounted; passes behind th
near horse; places himself between his horses, on the right of

l from the croups of the front-rank horses to the heads of rear-rank horses.

70. In the gun squad Nos. 6 and 7 and in the caisson squad highest numbered cannoneers in each rank act as horse lers. If there are less than six cannoneers in the squad the lest numbered cannoneer acts as horse holder, the horses g linked in single rank.

71. The guide of the gun squad is the gunner; of the son squad, the caisson corporal, or, in his absence, the can-eer on the right of the front rank.

To Form the Gun Squad.

72. The instructor indicates the point where the right of squad is to be and the direction in which it is to face and mands: ***LEAD OUT.***

he gunner repeats the command and places himself where right of the squad is to rest, faced in the proper direction.

he men lead out and form in double rank, taking the posi-l of stand to horse, with intervals of 18 inches between horses; h rear-rank man places his horse at the distance of 1 yard m the croup of the horse of his front-rank man, the horses ering each other.

To Mount.

73. 1. ***Cannoneers prepare to mount,*** 2. ***MOUNT.***

Executed as explained in the Soldier Mounted (240), the can-neers mounting without moving their horses out of ranks; necessary they make them give way slightly to the right or t.

If the command be: 1. ***Cannoneers,*** 2. ***MOUNT,*** the cannoneers cute at the command ***mount*** all that has been prescribed for commands ***prepare to mount*** and ***mount.***

To Dismount.

74. 1. ***Cannoneers prepare to dismount,*** 2. ***DISMOUNT.***

Executed as explained in "The soldier mounted" **(245)**, e cannoneers dismounting without moving their horses out

To Dismiss the Drivers.

440. The drivers being in line of pairs, teams, or sections, stand to horse, with teams unhitched and traces unhooked: *By the right (left, or, right and left),* 2. ***FALL OUT.***

If in line of pairs the movement is executed by each pair prescribed for each rider in "The Soldier Mounted" (25 If in line of teams or sections the leading driver on the ri executes the movement as before, being followed at 1 yard the remaining drivers of his team or section. The movem is then successively executed by the remaining elements of line.

If the instructor commands: ***FALL OUT,*** each driver leads pair directly to its stall or to its place for unharnessing.

441. As soon as the drivers have secured their horses at place for unharnessing, the instructor commands: ***UNHARNE*** or, 1. *By detail,* 2. ***UNHARNESS.***

The harness is removed, cleaned, and properly put in pla the horses are rubbed down and cared for. Having satisf himself by inspection that these duties have been properly p formed and that all the precautions required on return fr exercise have been observed, the instructor causes the harn to be covered. The men fall in, and are marched to the batte parade ground, and dismissed.

Management of the Pair.

442. The near horse is managed as explained in "The Soldi Mounted"; the off horse by the bridle reins and the wh The voice, used quietly in connection with the whip and t aids, is of especial service to the field artillery driver in t management and control of his pair.

443. ***The whip*** is habitually used in driving field artille teams. However, it will cause much harm and little go unless drivers are thoroughly instructed in and made to unde stand its correct use. It must never be used with a full-ar swing and never about the head or neck. It should be appli by a simple motion of the wrist, and, like the leg aids, shoul

77. The cannoneers having learned to align themselves
1 by man, the instructor establishes the basis of alignment
before and aligns the squads by the commands: 1. *Right*
t), 2. ***DRESS,*** 3. ***FRONT.***
t the command ***dress*** all the men except the base files move
ward and dress up to the line.
78. Alignment to the rear is executed on the same prin-
les; the instructor commands: 1. *Right (Left) backward,* 2.
SS, 3. ***FRONT.***
ll the men, except the base files, rein back, keeping their
ses straight, halt in line with, or a little in rear of the base,
immediately dress up to the line.

The Rests.

79. Executed as prescribed in "The soldier mounted"
58).

To Fall Out.

80. The squad being in line dismounted: 1. ***By the right***
t), 2. ***FALL OUT.***
The front rank man on the right followed by the man behind
n leads his horse 1 yard straight to the front and then directly
the stable or picket line. Each of the other front-rank men
ecutes the same movement so as to follow the horse of the
r-rank man next on his right at a distance of 1 yard.

To Dismiss the Squad.

81. Executed as prescribed in "The Soldier Mounted"
59).

To March in Line.

82. Being in line at a halt: 1. *Forward,* 2. ***MARCH.***
The squad moves off promptly, the guide marching straight
the front at the regular gait.
The instructor observes that the squad marches straight to
e front at the regular gait; that the men keep their horses

(*b*) A low, quiet *whoa* used in connection with the rein a leg aids to steady the horses, to decrease their gait, or to st them.

(*c*) Gentle, quiet, reassuring tones to calm a horse wh frightened or when patting his neck or otherwise rewardi him. Used with the chirrup or cluck at the moment a pair sho a disposition to hesitate or stop, they are the best possible aid encouraging them and keeping them in the collar in a heavy difficult pull.

(*d*) A harsh, angry, scolding tone shouted at a horse when is doing something wrong, for example, kicking. So used, t voice frightens or startles him and makes him stop his wro doing.

Shouting or yelling, except as indicated in (*d*), must not tolerated in the management of horses.

445. *The bridle reins* of the off horse are used in gather him, for steadying him, for checking his gait, for halting h and for reining him back. They are habitually carried in t left hand, so held as to maintain gentle contact.

When necessary to use the bridle reins of the off horse w some force, the driver draws them toward his right thigh, usi his right hand, still holding the lash in his left hand. T roller, fastened to the saddle, changes the direction of the for applied and serves to transmit an equal tension to both rei Unless the off horse is well trained and prompt in conformi to the movements of the near horse, the driver must frequent make use of the direct rein in controlling him; thus, he m reach over and feel the right rein in order to turn his head t the right and induce him to step into a turn in that directio The coupling rein may properly be used to lead the off hor into a turn to the left, but it must never be used to check h gait. Its use for this purpose has the effect of pulling the hea in, preventing the horse from traveling squarely, and causin galls and injuries on his outside shoulder. Off horses that ar too free and have the tendency to rush forward until the hea and neck are drawn in by the coupling rein are most easily an effectively driven on a short coupling rein and the right direc

o resume the oblique march: 1. *Forward*, 2. *MARCH*.
'hile obliquing, to resume the march in line: 1. *Left (Right) ;ue*, 2. *MARCH*.

To Turn and Halt.

87. Being in line: 1. *Squad right (left)*, 2. *MARCH*, 3. *FRONT*.
.t the command *march* the front-rank man on the right exe-es by the right flank and halts; each of the other men turns horse to the right, approximating the oblique and moving the shortest line without changing the speed, places himself east of the pivot man. The rear-rank men conform to the vement of the front rank and place themselves, covering their leaders at a distance of 1 yard. All dress to the pivot with-command.

:he instructor verifies the alignment from the pivot.

quad half right (half left) is executed in the same manner; pivot makes an oblique to the right.

To Turn and Advance.

388. Being in line at the halt or at the walk: 1. *Right (Left) n*, 2. *MARCH*.

The front-rank man on the right executes by the right flank d moves forward in the new direction without increasing the eed; each of the other men turns his horse to the right, approximating the oblique, and, moving at the trot by the shortest e, places himself abreast of the pivot man, when he takes e gait and direction of the latter. The rear-rank men conrm to the movements of the front rank and place themselves, vering their file leaders at a distance of 1 yard. During the rn the guide is, without command, on the pivot flank; the iginal guide is resumed without indication as soon as the rn is completed.

If marching at the trot the pivot man continues at the trot, ich of the others slightly increases his speed until he arrives n the line.

mands and movements they are to obey and execute when t team is hitched and maneuvered as a section. In this instr tion the drivers are frequently changed about so as to dri lead, swing, or wheel pairs, thus teaching them responsibility guides, distances, and intervals, and impressing upon them t necessity for attentive cooperation in order to develop inte gent and efficient teamwork. This is a most favorable formati for teaching all the movements employed by a section as a p of "The Battery Mounted," together with the commands a signals therefor.

449. This instruction by pair is then followed by the sa exercises with traces hooked but with teams unhitched. It ruinous to draft efficiency, and spoils the training of dr horses when a driver is hesitating, uncertain, or ignorant of movement, since this leads him to start or check his pair, swerve this way or that, or otherwise to work against or terfere with the other drivers in his team. It is therefore utmost importance that drivers, while undergoing instructi prescribed in this and the preceding paragraphs, learn and come thoroughly familiar with every movement used by the s tion in The Battery Mounted. When this is accomplished a when they thoroughly understand how to direct and hold th horses in a turn, and how to direct and control them in limb ing, the drivers are ready to take up the management of th horses in draft.

Teams and Their Management in Draft.

450. The mobility of a battery of field artillery depends a great extent upon its draft efficiency. This can be attain only by a thorough understanding and a correct application sound principles on the part of officers, noncommissioned officer and drivers. If the driving is not good, neither quick maneuver long marches, nor efficient transport service can be assured.

Teaming of Artillery Horses.

451. The weights behind teams are established on the as sumption that each horse does his full share of the work. Thi

ss as they arrive on the line and take the prescribed interval
89); the instructor places himself near the right to superin-
d the movement and gives the last command when all are
ned.

he instructor commands *left (right) into line*, according as
flank column is right or left in front.

93. The flank column is *right in front* when the front-rank
n are on the left of the rear-rank men; the column is *left in*
nt when the front-rank men are on the right of the rear-rank
n.

To Oblique in Flank Column.

94. 1. *Right (Left) oblique*, 2. *MARCH.*

o resume the oblique after halting: 1. *Forward*, 2. *MARCH.*

To Change Direction in Column of Twos.

95. 1. *Column right (left)*, 2. *MARCH.*

Executed as in "The Soldier Mounted" (350).

Maneuvers of Two or More Squads.

96. If it is desired to train two or more gun squads mounted the formations and movements laid down in the Gun Squad ounted, the squads are maneuvered by the same commands and ans as those prescribed for a single squad, with obvious modi-ations.

To Lead Out.

97. The cannoneers lead out by squads in the order of the mbers of their sections. At the command *lead out* by the structor or senior noncommissioned officer present, the can-oneers of the first section lead out as already explained; the ading cannoneer of each of the squads moves off in time to llow the last cannoneer of the preceding squad and places his orse 15 yards to the left of the front-rank horses of his squad. ! desired, this interval may be diminished.

As a general principle, horses under 7 years of age sh habitually be employed as off horses; also, in any pair the h of the better saddle conformation should be the near h and the freer driver the off horse. However, in any team horses should be interchanged in order that they may be tr to work willingly in lead, swing, or wheel, and as the off or horse in the pair.

To Start a Carriage or to Increase its Speed.

452. In all movements from a halt or in changing ga direction, each driver gathers both of his horses before app the aids or giving the signals which they are to obey.

In starting a carriage it is desirable that all the hors the team simultaneously apply power in the collar. Thoug is extremely difficult, since three or four drivers can not us start six or eight horses at the same instant, the endeavor so should always be made. A good start is rendered mor tain if the traces are reasonably well stretched before the is called on to move. In stretching the traces, however, a d must be careful not to permit his horses to bump into the c because such a practice tends to make them think that a on the shoulder means to stop. A good start is rendered ce if every horse steps slowly into the collar and holds there, q straining at his task until the slower horses in the team ov his motion and add sufficient strength to move the carriag gradual start, then, becomes of greater practical importance a simultaneous start. Chiefs of section and drivers have a stant tendency to start off too quickly. This evil is aggrav if the command for starting has been loud, sharp, and ab rather than low and prolonged. A good start is facilitated if command of execution habitually follows the preparatory co mand at a fixed interval.

At the preparatory command each driver gathers his hors at the command of execution he applies the proper aids to near horse, touches the off horse, if necessary, with the whip, speaks to both horses with a low cluck or chirrup, causing th

spond promptly by stepping slowly into their collars and ning until the carriage moves.

e same principles apply in increasing the speed of the age by passing to a faster gait. Abruptness or suddenness ovement is to be avoided.

ivers must appreciate the necessity for cooperation, and one must be constantly attentive to what the others in the are doing. Each should regulate his movements on those e pair ahead of him; the wheel driver especially must be ful that his pair does not lag behind or attempt to start the iage alone. As an example, for the wheel driver to have horses in the breeching when the others are in the collar is cusable.

hen, for an unexpected reason, a driver must stop his pair an not start it at the command he must give a warning call he others.

To Stop a Carriage or Reduce its Speed.

53. To the same degree that effort is made to avoid abrupt udden starts, so also should effort be made to avoid abrupt udden stops or reductions in speed. In stopping the carriage drivers hold their horses out of traction and stop with the dual stopping of the carriage. The wheel driver may, when irable, assist in stopping the carriage by holding his horses k in the breeching. The brake, if carefully and gradually plied so as not to jerk the horses, is of great use in stopping carriage or checking its speed. The lead and swing drivers ulate the movement of their pairs by those of the wheel pair, ping out of the way, but avoiding any strain on the traces.

To Back a Carriage.

54. The wheel driver is responsible for backing the car- ge. The other drivers must give him complete liberty of ce. Both horses are reined back together, quietly and adily according to the principles outlined in "The Soldier unted" (**307**).

Turns.

455. Turns are made to the right or left through angles 45° (the oblique), 90° (by the flank), or 180° (the about). all of these turns the lead driver directs his pair so that horse on the inside of the turn moves over the arc of a cir whose radius is 6 yards. It is desirable that all the horses the team remain in draft during the turn. When this is the c there is a constant tendency for the line of traction to become chord of the circle over which the lead driver is moving, and all horses to make the turn on two tracks on the haunches. order that the turn may not be too short, forcing some of horses to step directly to the side and perhaps step on each ot or knock their legs, all drivers must combat this tendency keeping their horses directed toward the outer circumference the turn. This is accomplished in a satisfactory manner if e driver keeps his horses set and going as if to make his ho on the inside of the turn move up between the horses of the p next in front. In this manner each pair will describe a cir which is only slightly smaller than that described by the p next in front; the abruptness of the turn on the haunches be reduced and the turn rendered easier.

If the outside horses were held accurately abreast of inside ones during the turn, the only trace in draft would be outer one of the outside lead horse. To avoid this and to ke all the horses in draft, it is necessary for the lead and swi drivers to hold their outer horses a greater or less dista behind the inner ones. The amount of this depends upon radius of the turn and the position of the pair in the team. is greatest with the lead pair, and diminishes progressiv with each pair to the rear. In the wheel pair, however, t outside horse should be ahead of the inside horses as much is allowed by the doubletree. The horses are brought abre of each other only when the turn is completed and the wh team straightened in the new direction.

In executing the turns at an increased gait the radius sufficiently increased to permit the horses to execute the mo

with ease and the gait is moderated when necessary to overturning the carriages.

The Turn in Limbering.

6. As the team arrives in close proximity to the carriage limbered it moves at a walk, at the command, when neces- of the lead driver. The lead and swing drivers hold their s back so that the wheel driver has complete liberty of . As the lead driver passes the lunette he starts to move air so that the inside horse passes over the arc of a small circle, radius approximately 3 yards, diameter in con- tion of the trail of the carriage. The other drivers ad- to make the turn on exactly the same ground, the whole moving so that the limber wheel will pass within about ot of the lunette. When the axle of the limber is nearly ne with the trail the wheel driver commands: 1. *Team,* 2. . At this command the lead driver slowly straightens his in direct prolongation of the trail, and the swing and l drivers follow his movements by slowly passing their es toward the same line. When the horses are straight his line the turn, if properly made, should have placed the le of the limber in prolongation of the trail. The wheel r then backs the limber as much as may be necessary to lit limbering.

roughout the movement it is essential that the traces of the and swing pairs remain loose. They are stretched out moment the limbering is completed.

To Confirm in Horses a Willingness to Pull.

. Almost any horse can be trained to be an honest and puller. Through ignorance, lack of judgment, bad man- nt, or laziness on the part of the driver he can far more be trained to be a shirker and a quitter. A horse will ll freely or willingly if to do so causes him pain. It is ial, therefore, that his harness, especially his collar, fit with absolute comfort; that his shoulders be hardened

through careful conditioning and rational work and are th
fore not tender or sore; and that he apply his weight in t
collar slowly and gradually, without sudden starts or jerks th
would pound and bruise his shoulders. Even though all of t
above conditions be favorable, a horse will not pull unless he
confirmed in the belief that when he applies his strength t
load behind him will yield. Thus a willing horse may be hitch
to an immovable object and within a few minutes, especia
if he be yelled at or whipped, be transformed into a sulker a
a balker that only long, patient, and careful handling will c
*To allow repeated trials and failures in pulling is the quickest a
most effective method of ruining the draft efficiency of any te*
It must be borne in mind that there is a limit to the dr
power of any artillery team and that this power, due to t
tandem method of hitching, is, even with perfect driving, fr
20 to 50 per cent less than the sum of the powers of the in
vidual horses. A team should never be given deliberately
task that is clearly beyond its strength. It is right and pro
in order to train a team and to develop its draft power to
maximum, to give it from day to day or week to week ta
that gradually increase in difficulty. Such tasks will oc
sionally stop the team. No evil results will follow if the a
mals, when so stopped, are permitted to rest quietly for a f
minutes and recover their wind. The first tendency of t
inexperienced noncommissioned officer or driver when a te
stops is to urge it forward immediately. This is exceedin
wrong. The horses are either taking an absolutely needed r
or are showing by their action that they need assistance. Wh
the horses are resting a sufficient number of cannoneers wi
drag ropes should be brought up so that when the signal
move is given *the carriage will certainly move.* Such a practi
trains the horses that there is no such thing as failure
defeat in a pull and therefore confirms a willingness to p
whenever they are called upon to do so. A team so trained ma
when it has become hardened to its work, be called on to ma
the attempt to pull out of a difficulty unaided unless such
task is clearly beyond its strength. However, if the attem

s it must be appreciated that the team to a certain extent been injured and that for some time to come it must not in be subjected to the risk of failure. A team, trained and naged in accordance with these principles, can always be nted on to occasion a minimum of delay to a battery which ounters difficulties in transport.

Driving up Steep Slopes and Over Difficult Ground.

58. In order to exert his maximum strength when in a icult pull, the draft horse must get the greatest possible ght forward and into the collar. By maintaining a low, ended, and advanced carriage of the head and neck he is e to add considerably to his power of traction. He should, refore, be allowed full freedom of rein when in a heavy pull not be forced to fight the driver's hand. Because a horse exert a greater power of traction when ridden, it is often antageous when in a difficult pull to mount cannoneers on off horses. When pulling up a hill the drivers should lean l forward and should encourage their horses by a low and et use of the voice.

he most favorable gait for heavy pulling is a steady, uniform lk, with every horse straight in his collar and the team aight from lead to wheel. The tendency to rush a hill or other icult pull must be avoided. Any increase of speed for such urpose can not be taken up with perfect uniformity by all horses of a team and the footing for each horse is rendered re uncertain and difficult. This causes undue weight to come on the shoulders of some while none at all may be borne by ers. Uneven draft quickly results, often to the point of lling the team. In going over a V-shaped ditch unusual effort uld be made to keep the horses at a steady walk. In such a ce the brake must be used with great care, so that the traces l be tight and the horses in draft during the entire crossing. e brake should be released a little too late rather than too n, for, in the latter case, the carriage rushes forward into bottom of the ditch, where it stops, and the horses on again ning into draft are given a violent jerk.

When maneuvering off the road, steep ascents should be taken in line to avoid checks. When on a road or track, if circumstances permit, the battery should be halted at the foot of the hill and carriages or sections sent up at about one-minute intervals. This gives opportunity for the teams to be halted to rest and blow at the top, or, if the hill be a long one, to be halted a number of times during the ascent. Each carriage or section after such a halt, moves out in time for the carriage or section which follows to halt on the same ground. Cannoneers, instructed to follow and watch a carriage in difficult draft, may by applying their strength at the moment a stop seems imminent, prevent the carriage from stalling.

When a carriage has been stalled it may, in some cases, be found best to have cannoneers first back it for a few feet, in order to put both horses and carriage on more advantageous ground from which to make the start.

459. Cannoneers, should be instructed and regularly practiced in assisting the horses by working at the wheels and along ropes attached to the carriages. Much delay and confusion on the march may be avoided by such training. To avoid interference and to insure teamwork, attention should be given to the spacing of the men along the rope. Ropes may be attached in the following ways:

(*a*) ***For ordinary pulls.***—By a running bowline or a clove hitch around the trail of the carriage, well back near the breech of the gun.

(*b*) ***For a short, hard pull, as in lifting a carriage out of a ditch.***—By a wheel purchase. To use a rope as a wheel purchase: With one end a turn is taken around the felloe as near as possible to the ground; the rope is placed over the short end so as to hold it against the tire, and is then laid on the tire and passed over the wheel to the front. The rope should be so placed around the felloe that it may be pulled clear of the wheel when the short end is released by the turning of the wheel. Should the wheel slip, a rope may be wound around the felloe and tire with turns about a foot apart to enable the wheel to get a grip

c) ***For use without teams or when it is desired to use the team dvance of its regular place.***—By passing the hook end of one e and the ring end of another under the doubletree on oppo- sides of the pole, and hooking together above the pole in rear the doubletree. With each rope a half hitch is taken around pole near its end. These ropes may be extended to any de- ed length by others, and either attached to a limber, in case is desired to use a team, or used with cannoneers. This thod is useful in crossing dangerous bridges and on steep pes where horses can not get good footing or can not main- n uniform draft.

460. When a carriage is mired it may be pulled out by at- hing it with ropes to the middle point of a log or balk. Each l of this balk is attached to the pintle of a limber. A full or ended team is hitched to each limber. The balk acts as a nt doubletree between the two limbers, and with careful ving the draft will be very even.

461. The start of a stalled carriage may at times be facili- ed by turning the pole either to one side or the other as far it will go and straightening the team in that direction. In s way the first effort of draft serves only to turn the mass the weight about a vertical axis, with the trail as the lever n. The yielding obtained in this way encourages the horses d brings the total weight into their collars more gradually.

462. In a heavy pull a driver should always watch the traces front. Should they become loose, he very gradually holds s own pair back until they tighten up and the horses to the nt again come in draft. The whole team may then, if neces- ry, be urged forward a little faster. This method insures all e horses coming into draft without the jerk, so disconcerting the whole team, that frequently results when a pair is brought to draft by being urged forward at increased speed.

463. Carriages should be driven squarely across sunken roads, its, narrow ditches, etc., so as to avoid whipping the pole.

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OFFICE OF THE CHIEF OF STAFF

PROVISIONAL
Drill and Service Regulations for Field Artillery

(Horse and Light)

1916

VOLUME II

Parts IV, V, VI, VII, and VIII

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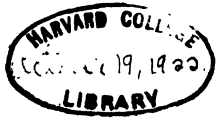

Prof. Harvey N. Davis,
Cambridge.

WAR DEPARTMENT.

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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
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The following provisional system of Drill and Serv-
e Regulations for Field Artillery (Horse and Light),
916, is approved and herewith published for the in-
rmation and government of the Regular Army and
e Organized Militia of the United States.

By order of the Secretary of War:

H. L. SCOTT,
Major General, Chief of Staff.

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Part IV.

CHAPTER I.—THE BATTERY MOUNTED.

Section I.—Object and Sequence of the Instruction.

464. The special object of this instruction is the training of ıe personnel of the battery in the dispositions and maneuvers ɔquisite for getting the guns into position for action. Methods ! training in opening and delivering fire are laid down in Firing ıstruction. The two kinds of training supplement each other ɑd should be practiced concurrently.

465. A progressive order of instruction conforming to the ɑnual program is observed. The gun squads, the drivers, and ıe special details having been instructed under the close super-ision of the captain (**34**), he then takes up and completes the ·aining of the battery as a whole. The preliminary instruction ɑder the immediate charge of the lieutenants is executed with reat precision and attention to detail. On its thoroughness epends to a great extent the fighting and maneuvering effi-ency of the battery. The early part of this preliminary in-ruction is carried on in the most favorable place, as the gun ırk and the riding school. The latter part, however, should ɜ carried on by hitching and taking the carriages outside, thus ıving both cannoneers and drivers a constant change of scene ɑd so avoiding monotony. The guns having been placed in ɔsition, the elementary training then continues. The executive ɔmpletes and perfects the training of the gun squads; the ɔconnaissance officer develops the special details, and the lieu-ɜnant in charge of the horses completes the instruction out-ɜed under The Driver. It is also the best time for this officer, ɣ putting his drivers with the pairs unhitched on a large out-de circle where he can closely watch the riding of each man,) employ steady and regular conditioning trots, gradually in-

creasing in length from day to day. Thus, when instruction by battery begins, each man in the organization should have been carefully specialized for the particular task expected of him, and both men and horses should have been brought to a thoroughly fit physical condition. It remains then for the captain, during battery instruction, to get his organization working together smoothly and effectively as a team, and so ready to take its place in the battalion.

466. During the period devoted to battery instruction daily practice should be had in the reconnaissance and occupation of positions; in advancing to such positions over varying kinds of terrain which frequently should involve difficulties in transport or a march of greater or less distance; in the determination of firing data for direct and indirect laying at fixed and moving targets; in simulated fire, etc. This practice should approximate the conditions of war as nearly as possible.

During this instruction the captain must make every effort to avoid the disorganizing influence of long periods of idleness for any of the men. Each day's work should be according to a prearranged and carefully thought out plan, under a tactical situation having a definite object, and so arranged that every man and every animal will be required to work diligently from its beginning to its completion. Thus, during simulated fire the drivers should not be permitted to remain idle but should be caring for their horses; handrubbing shoulders or backs; unhitching and establishing a picket line on the limbers; or working their pairs on a circle to secure and maintain condition, etc. The whole instruction period should be marked by energy, vim, purpose, decision, and industry, and should then be terminated punctually and in ample time for the men properly to care for the animals and matériel before the next meal hour.

When for any reason this time is seriously encroached upon, the horses should be watered and fed, especial care having been taken that they arrive in park with temperature and respiration restored to normal, and the men permitted to get their meal. Harness, horses and matériel are cared for afterwards.

SECTION II.—GENERAL PROVISIONS.

467. Recruits, after their first three months' instruction, nd older men during any instruction year, are specialized for heir particular places in the battery, such as cannoneer, driver, elephone operator, etc.

468. The saber is carried at ceremonies. When the captain raws saber the lieutenants will also draw saber.

469. Unless otherwise stated, the text refers to light batteries. With necessary modifications in distances and in the luties of cannoneers, it becomes equally applicable to horse batteries.

Special directions are given herein when the gun squads of orse batteries have to make any particular movement. When he gun squads are not mentioned, they have only to maintain heir posts in rear of their caissons, dressing toward the side of he guide. In section column the guide of each gun squad is without indication to the right. When flank column or double section column is formed, the gunners form their squads on the outer flank of the caisson, the cannoneers of the front rank lligned on the axle of the limber.

470. A gun section consists of a gun and its caisson, manned, orsed, and equipped.

A **caisson section** consists of two caissons, manned, horsed, and quipped.

The leading caisson of each caisson section in the normal rder in park is called the **first caisson**; the other is called the **econd caisson.** What is prescribed in the text for pieces and aissons of gun sections applies, with obvious modifications, to first and second caissons of caisson sections, respectively.

471. The rests are executed and the attention is resumed according to the principles already explained for The Soldier Mounted and The Driver (**459**).

SECTION III.—ORGANIZATION OF THE BATTERY.

472. The battery as organized on a war footing is shown in the Tables of Organization. It is commanded by the captain.

The first platoon is commanded by the executive; the second platoon by the assistant to the executive; the third platoon by the reconnaissance officer, when that officer is not otherwise employed; and the fourth platoon by the lieutenant in charge of Department B (82).

The **first sergeant** is assistant to the captain, and is responsible to him for the general good order, police, and discipline of the battery.

The **stable sergeant** is responsible for the general care of the public animals assigned to the battery and the good order and police of the stables, picket lines, etc.

The **supply sergeant** is responsible for the care of all Government property issued to the battery.

The **mess sergeant** is responsible for the proper messing of the battery.

The **chief mechanic** is responsible for the good order and repair of the matériel in actual use by the battery. In action he assists the executive.

The **sergeants** command sections.

The **gunners** are responsible for the good order of their guns, carriages, limbers, and equipment.

Each **caisson corporal** is placed in charge of a caisson, and acts as assistant to his chief of section.

473. On subdivision for action the battery is divided into the **firing battery** and the **combat train.** The firing battery comprises the first five sections. It is under the immediate command of the captain. The combat train comprises the sixth, seventh, eighth, and ninth sections. It is commanded by the lieutenant in charge of Department B. He is assisted by the stable sergeant.

474. On a peace footing the sixth, seventh, and eighth sections are not manned or horsed. Otherwise the organization is similar to that on a war footing and is separately shown in the Tables of Organization.

475. In light batteries the cannoneers are on foot or mounted on the carriages at the discretion of the captain; they are not

red to mount or dismount when the battery is marching trot or gallop.

horse batteries every one is mounted; the cannoneers, ex- the horse holders, dismount to serve the guns.

ECTION IV.—FORMATIONS OF THE BATTERY AND POSTS OF INDIVIDUALS.

Formations.

76. The habitual formations are the **order in line**, the **order** **ection column**, the **order in flank column**, and the **order in** **ery.**

77. The **order in line** is that in which the sections of the **ery** are formed abreast of each other in the order, or the **rse order**, of their numbers from right to left. The car- **es** are limbered, and in each section are in section column, pieces being either in front or in rear of their caissons. In normal order in **park** the pieces are usually in front.

f the carriages of each section are in double section, the nation is called a **double section line.**

78. The **order in section column** is that in which the sections the battery follow each other in the order, or the reverse er, of their numbers, from front to rear. The carriages are bered, and in each section are in section column (**424**), the ces being either in front or in rear of their caissons.

If the carriages of each section are in double section, the nation is called a **double section column.**

79. The **order in flank column** is that in which the sections the battery follow each other in the order, or the reverse ler, of their numbers, from front to rear. The carriages are bered, and in each section are in flank column, the caissons ing all either on the right or left of their pieces (**404**).

80. The **order in battery** is that in which the pieces and issons of the gun sections, placed for action, are in line in e order, or the reverse order, of their permanent numbers, om right to left; the caissons of the fifth section, unlimbered,

one on each flank of this line, or otherwise disposed by dir tion of the captain or the executive; the limbers either in re of their carriages or formed at such other place as the capt may order.

The sections comprising the combat train, when present, posted at the discretion of the captain.

481. The intervals and distances for hitched carriages (4 apply to the formations of the battery. In the order in batt the intervals between adjacent wheels of gun carriages is t prescribed for hitched carriages in line.

In column or in line, the distance between a carriage and mounted gun squad is 2 yards; in flank column the distan between caissons is such as to permit each caisson to ma abreast of its piece; in line, when the pieces lead, the distan between caissons of the caisson sections is such that they ma in line with the caissons of the gun sections. In battery, w the limbers take post in rear of their carriages, the distan between the line of pieces and that of the teams is 25 yar measured from the rear of the caissons to the heads of the l horses.

482. When the teams are short one or more pairs, the t tervals are diminished 3 yards for each pair that is missi should the teams have more than three pairs the intervals a increased 3 yards for each additional pair.

If any carriage has lost one pair of horses or more, it has t same position as if the team were complete.

Captain	8 yards in front of the battery opposite the center.	Opposite the center of the column and 15 yards from the left flank.	Opposite the center of the column and 15 yards from its flank; on the left when the right section leads, and on the right in the reverse order.	Halfway between the two center sections, 10 yards in rear of the line of the trail spades.
Platoon commander	Halfway between his sections and in line with the lead drivers of his leading carriages.	Opposite the center of his platoon, 4 yards from the left flank.	Halfway between the pieces and caissons, and in line with the lead drivers of his leading carriages.	Halfway between the guns of his platoon, and 5 yards in rear of the line of the trail spades.
First sergeant	Halfway between the center sections, opposite the rear of the rear carriages.	Opposite the center of the battery, 4 yards from the right flank.	Opposite the center of the column and 4 yards from its flank; on the right when the right section leads, and on the left in the reverse order.	Halfway between the two center sections, 20 yards in rear of the line of the trail spades.
Chief of section	Boot to boot with the lead driver of his leading carriage.	Same as in line.	Boot to boot with the lead driver of his piece. In double section he has the same post.	2 yards in rear of his caisson and opposite its center.
Caisson corporal	Boot to boot with the lead driver of his caisson; but if the chief of section is posted with the caisson, then boot to boot with the swing driver.	do	Boot to boot with the lead driver of his caisson.	Same as in line.
Guidon	Abreast of the guide of the battery, and 2 yards to his left. Before leaving park, 4 yards from the right flank of the battery aligned on the lead drivers.	Abreast of the leading guide of the battery, and 2 yards to his left.	Abreast of the guide of the battery, and 2 yards to his left.	With the combat train.
Bugler	Boot to boot with each other, 2 yards in rear of the captain.	Same as in line.	Same as in line.	Same as in line.

484. The cannoneers take the posts prescribed for them members of gun or caisson squads.

In horse batteries, the post of the gun squad with the c riages limbered is 2 yards in rear of the caisson except flank column or double section column (**469**). When the c riages are unlimbered, the horse holders, with the horses of squad, take post 2 yards in rear of the caisson limber.

485. The special details are posted and maneuvered with first caisson of the fifth section in a manner similar to t of a mounted gun squad.

486. When the battery is accompanied by such personnel the supply sergeant, the stable sergeant, mess sergeant, chanics, cooks, etc., when the ninth section is not present, s men are assigned to posts at the discretion of the captain. will usually be found desirable to post them as members of or caisson squads, if they are dismounted; or, if they mounted, to post them in line boot to boot in the order of r from right to left as follows: In the order in line, 4 yards f the left flank of the battery, abreast of the lead drivers; in order in battery, 4 yards from the left flank of the line limbers or teams, abreast of the lead drivers; in column, eit 4 yards in front of the leading section, or 4 yards in r of the last section, according as the column has been form toward their flank of the battery or the flank opposite. Dur the maneuvers of the battery they retain their relative positi and do not change to the opposite flank on account of the b tery being faced to the rear.

487. The posts designated in the foregoing table are typical ones. The captain, however, goes wherever his presen is required, where he may best observe, and where his co mands may best be heard. The lieutenants leave their posts it is necessary for the purpose of supervising the work of th platoons. The chiefs of section habitually maintain their po during the maneuvers of the battery; but during the practice fire discipline, during marches, and at other times when nec sary, they leave their posts in order to supervise the work their sections.

SECTION V.—THE PARK.

Disposition of the Carriages.

88. The carriages are ordinarily arranged in park in the er in line, the sections arranged from right to left in the er of their numbers, the pieces in the front rank. The in- al between adjacent carriages may be either the normal rval or such as the captain may direct; the distance between ranks of carriages is such that, when hitched, the distance is t prescribed in paragraph (428).

To Form the Battery in the Park.

89. The battery, dismounted, being formed on the battery ade (151), the first sergeant commands: **Drivers to the at.**

The chiefs of section and driver squads step 6 yards to the nt; the chiefs of section place themselves in front, and the lividually mounted men in the line of file closers of the ads thus formed. The first sergeant sees that suitable noneers are detailed to replace absent drivers, closes the ver squads toward either flank, and directs the senior chief section to march them to the horses.

On arrival at the stable or picket line, the chief of section in rge halts the drivers and commands: **Harness.** The drivers l out and harness under the supervision of their respective lefs. Chiefs of section and other individually mounted men ddle their horses while the drivers harness.

The drivers having been marched off, the first sergeant ses the gun squads to either flank and directs the senior nner to march them to the park. The senior gunner, on rival at the park, posts the gun squads with their carriages. If the carriages are in a gun shed, the senior gunner has the lumn in front of the building, gives the necessary directions r the formation of the park, and commands: **Form park.**

The cannoneers fall out, the carriages are run out by hand id formed in park.

The park being in order, the senior gunner posts the ca noneers at the carriages limbered (181). He then command **Put your carriages in order.** At that command each gunner a No. 4, under the supervision of the chief mechanic, prepare t carriages for hitching in. The remaining cannoneers eith assist in this work or are sent to assist in policing the pic line or stables, as may be directed. They are returned to th posts by the time the teams are hitched.

When the horses are harnessed, the first sergeant designat the place of formation and commands: **LEAD OUT;** or, 1. Fi (such) section, 2. **LEAD OUT.**

The sections lead out and form in column. The first s geant mounts the drivers, conducts the column to the park, po the teams with their carriages, and causes them to be hitch

If the park is near by, the first sergeant, as soon as the hor are harnessed, commands: 1. **To your carriages;** 2. **LEAD OU** or, 2. **First (such) section,** 3. **LEAD OUT.** He then gives t commands for hitching as before.

In all cases the first sergeant sees that the cannoneers p form their duties in the park and that the drivers harness, le out, and hitch with the least practicable delay and with noise or confusion.

490. In the field when the horses are harnessed at the c riages the duties are performed in a similar manner. T senior chief of section, on the arrival of the drivers at the pic line, commands: **Harness and hitch.** The teams are hitched the drivers, under the direction of their chiefs of secti according to the methods heretofore prescribed.

491. In horse batteries, as soon as the park is formed and t carriages made ready for use, the senior gunner directs the g ners to march their squads to the horses and have the hor saddled.

The squads may be required to lead out with the teams their sections. In this case they form in rear of the tea and are marched to the park with them, each gunner posti his squad in rear of its caisson as the teams of the section a being posted with their carriages.

If the squads are not ready when the teams are harnessed e first sergeant may direct that the teams be led out and sted as above prescribed; when ready each squad is then led t and formed by its gunner, marched to the park, and posted.

492. The lieutenants reach the park or the stables at such ne as is necessary for them to superintend the proper details their departments (82). They take their posts as chiefs of atoon, as soon as the teams are posted with the carriages, and time to superintend the hitching.

493. Each chief of section, as soon as his teams are hitched, akes a minute inspection of his section and reports the result his chief of platoon.

494. Each chief of platoon, having received the reports of his iefs of section and made a general inspection of the platoon, mmands: **REST.**

495. The special details and the other individually mounted en take their posts during the hitching.

The buglers report to the captain at such time and place ; he may direct.

496. Upon the approach of the captain the chiefs of platoon ll their platoons to attention, and as soon as the captain takes is place in front, report in succession from right to left: **Such) platoon in order, sir;** or if anything be missing or out of rder they so report.

As soon as the chiefs of platoon have reported, the first ser-eant reports to the captain (151).

To Dismiss the Battery.

497. As soon as the battery is parked each chief of section akes a minute inspection of his section and reports all losses r injuries to the chief of platoon; the chiefs of platoon then eport in succession from right to left: **(Such) platoon in order, ir;** or if anything be missing or out of order they so report.

The reports having been made, the captain gives such instruc-ions as may be necessary, and directs the first sergeant: **Dismiss he battery.** The officers return saber, if drawn, and fall out.

The first sergeant commands: 1. **Cannoneers;** 2. **UNHITCH;** or, 1. **Drivers,** 2. **UNHITCH,** 3. **UNHOOK TRACES.**

The special details and other individually mounted men leave the park and return their horses to the stable or picket line.

The teams being unhitched, the first sergeant marches them to the stable or picket line and commands: **FALL OUT.** Each chief of section thereupon takes charge of his section, dismounts the drivers, causes them to unhook traces, if necessary, and lead to their places for unharnessing.

If the stables or picket lines are close by, the first sergeant commands: 1. **By the right (left, or right and left),** 2. **FALL OUT,** and the drivers lead at once to their stalls or to their places on the picket line.

The lieutenant in charge of Department A, assisted by the chief mechanic, superintends the work of the cannoneers in caring for the wheeled matériel.

The lieutenant in charge of Department B, assisted by the first sergeant and stable sergeant, superintends the work of the drivers in caring for their harness and horses.

498. In the field, when the horses are unharnessed at the carriages, the duties are performed as above described, except that the first sergeant, when directed to dismiss the battery, commands: 1. **Drivers,** 2. **UNHITCH AND UNHARNESS.**

The teams are unhitched and unharnessed by the drivers under the direction of their chiefs of section, according to the methods heretofore prescribed, the horses being tied to the picket line as soon as unharnessed.

499. In horse batteries, while the drivers are unhitching, the senior gunner forms the gun squads, marches them to the stable and commands: **FALL OUT.** Each gunner conducts his squad to its place in the stable and causes the cannoneers to unsaddle and care for their equipments; he assigns suitable cannoneers to the care of the horses, so that there is one man for each two animals; he then marches the remaining cannoneers back to the park to care for the matériel.

SECTION VI.—ROUTE MARCHES.

)0. The section column is the habitual column of route; listance between carriages is that prescribed in paragraph but may be increased when the ground is difficult. When ength of the column is not a matter of importance, distances also be increased to avoid thick dust.

ing in march: **ROUTE ORDER**, or **AT EASE.**

:ecuted according to the principles already prescribed.

resume the attention, the captain commands: 1. **Battery,** **TTENTION.**

ie leading carriage is responsible for, and sets the pace of, narch.

ie post of the captain on a route march is 15 yards in front ie lead horses of the leading carriage. The captain, how- must frequently let the column pass him in order to observe condition of men and horses.

ie bugler accompanies the captain; the other, the executive. third bugler is present, he accompanies the commander of combat train.

ie chiefs of platoon habitually march opposite the rear lages of their platoons and superintend the march, going rever their presence may be required.

ie chiefs of section leave their posts whenever necessary to rintend the march of their sections.

t each halt, chiefs of platoon and chiefs of section care- r inspect to see that their drivers faithfully perform their es.

) avoid dust, the officers and noncommissioned officers may ch on the windward side of the column. For similar reasons cannoneers are permitted to march on the right or left, to advantage of a footpath, etc.

hen the road is suitable, the drivers and horses should be ed frequently by dismounting the drivers. Before going n hill or over rough parts of the road, the wheel drivers uld mount without command, dismounting again when on level or when the rough place is passed.

In horse batteries the gunners, whenever necessary, fo their squads in column of twos, re-forming line as soon as ground permits. They also cause their cannoneers to dismo and lead whenever the drivers are dismounted.

Constant attention should be given by each officer, chief section, and caisson corporal to insure the proper handling every team and the correct adjustment of harness. T should see that each team horse does his share of the wo that no horse is overworked or overheated, that distances preserved, and that no carriage, while in the column, mo at a gait other than that ordered. No practice is m fatiguing and injurious to horses than the alternate trot and walking so often seen at the rear of a column.

During marches, the principles outlined under Teams their Management in Draft (450–463) and Care of Horses the March are to be observed and followed.

SECTION V".—COMMANDS, SIGNALS, ETC.

Commands.

501. Commands are given by the captain either verbally, by arm, bugle, or whistle signals. When verbal commands given, they may be supplemented by the appropriate signal

502. Chiefs of platoon repeat the commands of the capt or give appropriate commands to their platoons in time to sure the proper execution of the maneuver. The chiefs platoon ordinarily give their commands verbally, supplement if necessary, by the appropriate arm signal, and see to it t the commands of the captain are understood and correctly ecuted by their platoons. If a chief of platoon does not h a command, he governs himself by what he sees executed the adjoining platoon.

503. Chiefs of section repeat the commands of the chi of platoon, or give appropriate commands to their sections time to insure the proper execution of the maneuver. Chiefs section ordinarily give their commands by arm signals, s

mented, if necessary, by verbal commands, and see to it t the command is understood and that it is correctly ex- ted.

Arm Signals.

504. Signals are ordinarily made with the right arm, but y be made with the left when more convenient; when made h the left arm the reins are taken temporarily in the right id.

f the saber is in hand, the signals are made in a manner ilar to that prescribed for the arm.

505. Ordinarily, before making a signal for the execution a movement, the captain places himself where he can be n by the battery, generally with his horse facing in the same ection as the team horses, and signals the attention with the istle or bugle.

The signals prescribed for the different maneuvers are paratory signals; for the signal of execution the arm is tended vertically and then lowered quickly to the side. If movement involves a change in the direction of march, the ptain moves his horse in the new direction on making the eparatory signal.

506. Preparatory signals:

Attention.—Extend the arm vertically and move it slowly back d forth from right to left.

Forward.—Extend the arm vertically and lower it to the front til horizontal.

By the right (left) flank.—Extend the arm vertically and lower to the right (left) until horizontal.

Right (Left) about.—Extend the arm vertically and describe wly a large horizontal circle with the hand; then extend the m to the left (right) and describe a horizontal arc to front and ght (left).

Countermarch.—Extend the arm vertically and describe ickly several horizontal circles with the hand.

Right sections forward.—Extend the arm vertically and then rust several times to the front.

Right (Left) oblique.—Extend the arm obliquely upward to th right (left) and front, and then lower the arm, describing vertical circle on the right (left) side of the horse.

To increase the gait.—Carry the hand to the shoulder, forear vertical; extend the arm vertically from this position and r peat several times.

To decrease the gait.—Hold the arm horizontally above and front of the forehead.

To indicate an increased or decreased gait for a maneuv the appropriate signal is made just after the preparatory s nal for the maneuver.

To halt.—Extend the arm vertically and hold it there until t signal is obeyed.

To change direction to the right (left).—Extend the arm v tically; lower it to the left (right) until horizontal and d scribe a horizontal arc to the front and right (left).

To close intervals.—Point to the section on which the interv are to be closed, and then signal right (left) oblique, or le and right oblique, according as the intervals are to be closed the right (left) section or on an interior section.

To extend intervals.—Point to the section on which interv are to be extended, and then signal left (right) oblique. right and left oblique, according as the intervals are to extended on the right (left) section or on an interior sectio

Right (Left) by section.—Point at the right (left) section a signal forward.

Right (Left) front into line.—Extend the arm vertically a describe several large vertical circles on the right (left) si of the horse.

Right (Left) into line.—Signal a change of direction to t right (left), followed by describing small circles with the ha while the arm is extended to the right (left).

Pieces front.—Extend the arm horizontally to the front a then move it several times through a small vertical arc.

Caissons front.—Extend the arm horizontally to the front a then move it several times through a small horizontal arc.

Flank column, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through small horizontal arc.

Double section, right (left) oblique.—Extend the arm horizontally to the right (left) and then move it several times through small vertical arc.

The signals for **flank column**, or **double section, right (left) oblique**, apply also for the formation of flank column or double section to the right (left) after limbering.

Action front (right, left, rear).—Extend the arm vertically; then lower quickly to the front (right, left, rear), and repeat several times.

Limber.—Extend both arms laterally.

Whistle Signals.

507. **Attention.**—One long blast.

Cease firing.—One long blast. Given only when the battery in position and firing service or subcaliber ammunition.

Special Detail Report.—Three long blasts.

Cannoneers Report.—Several short, sharp, and rapid blasts.

Chiefs of Section Report.—One long, followed by one short, blast, the whole signal repeated once.

Chiefs of Platoon Report.—Two long blasts.

At the signals for reporting, the personnel indicated report in person to the captain.

SECTION VIII.—MANEUVERS OF THE BATTERY.

Guides.

508. The guide of a carriage is its lead driver; of a section or section column, the lead driver of its leading carriage; of a section in double section, the lead driver of its left carriage.

Chiefs of section supervise the gait and direction of march of their sections.

In section column, the guide of the leading section is the guide of the battery.

509. The guide of the battery in line is the guide of the right, left, or center section.

510. The guide of the battery in flank column is the guide of the leading carriage on one flank or the other.

511. During an oblique march the guide of the battery is without indication, the guide of the leading carriage on the side toward which the oblique is made.

512. On leaving park the guidon at once posts himself with the guide of the battery. If a subsequent maneuver places the guidon at the rear of a section column, he hastens to post himself with the guide of the leading section; if with a rear carriage in line or in flank column, he hastens to post himself with the guide of the leading carriage nearest his former position, or takes post with the indicated guide in case a guide is announced. On the formation of double section the guidon posts himself with the left carriage of the guiding section. During an oblique march the guidon does not change position.

513. With the exception just noted, the guide is habitually toward the guidon; while he is changing position, it is toward the guide with whom he is to take post.

514. The captain may announce or change the guide thus: **Guide (right, left, or center).**

515. If the captain desires, he may place himself in front of any carriage of the battery, and command: **Guide on me.** The carriage in rear of the captain then follows his movements and the others guide on this as the directing carriage, regulating their march and gait so as to maintain their proper relative positions. The guidon posts himself with the directing carriage.

Gaits.

516. Unless otherwise specified, horse artillery executes the movements herein prescribed at the walk, trot, or gallop; light artillery, at the walk and trot only. For light artillery the gallop should usually not be used, except for short distances.

ien all carriages are in line or column and when a change of rection for any carriage is not involved (**36–38**).

517. In changes of formation the carriages which establish e direction and rate of march of the new formation are termed recting carriages.

518. Reducing the gait one degree is to be understood as pass- g from the gallop to the trot, from the trot to the walk, or om the walk to the halt.

Increasing the gait one degree is to be understood as passing om the halt to the walk, from the walk to the trot, or from e trot to the gallop.

519. The following rules govern the gaits during changes formation:

ovements from Column into Line, and Analogous Movements.

Rule I. When a change of formation requires certain carriages gain ground so as to reach specified positions abreast of the irecting carriages, the captain may or may not announce an ıcreased gait for the movement. If he announces an in- eased gait, the directing carriages maintain their gait; the ther carriages move at the gait announced until they have eached their new position, when they take the gait of the irecting carriages.

If the captain does not announce an increased gait, the di- ecting carriages reduce their gait one degree; the others aintain their gait until they reach their new position, when hey take the gait of the directing carriages. If the movement s executed from a halt or while marching at a walk, and an ncrease of gait is not ordered, the directing carriages advance hree carriage lengths toward the front of the new formation nd halt.

This rule applies to forming line from column, double section ine from line, flank column from section column or double ection column, double section column from section column or lank column, closing or extending intervals, and wheeling by battery.

Movements from Line into Column, and Analogous Movements

Rule II. When a change of formation requires the directing carriages to gain ground in order to precede the other carriages, the captain may or may not announce an increased gait for the movement. If he announces an increased gait, the directing carriages take the increased gait at once, the other carriages take it up so as to follow the movement in their proper order.

If the captain does not announce an increased gait, the directing carriages maintain their gait, the others reduce the gait one degree, and take the gait of the directing carriages in time to follow the movement in their proper order. If the movement is executed from a halt, or while marching at a walk, and an increase of gait is not ordered, the directing carriages move at a walk; the others remain halted, or halt and take up the gait of the directing carriages as before.

This rule applies to forming column from line, line from double section line, section column from flank column or from double section column, and passage of carriages.

To Align the Battery.

520. The battery being in line at a halt:

If the section on the side toward which the alignment is to be made is not in proper position, the captain establishes it in the position desired, and commands: 1. **Right (left)**, 2. **DRESS**, 3. **FRONT.** At the command **dress** the other carriages move forward or backward, preserving their intervals; the drivers cast their eyes to the right and dress on the drivers of the carriages established as a basis of alignment. The captain places himself on the right flank in line with the wheel driver of the base carriage, facing to the left; he quickly establishes the wheel driver of the leading carriage of the second section on the desired line, and then superintends the alignment of the other wheel drivers of the front-rank carriages. The first sergeant similarly superintends the alignment of the wheel drivers of the rear-rank carriages. The captain commands **front** when

ılignment is complete, at which command the captain and sergeant resume their posts and the drivers turn their to the front.

1. In horse batteries, at the command **dress** each gun squad s itself toward the side ordered, under the supervision of unner.

To March to the Front.

2. 1. **Forward**, 2. **MARCH.**
:ecuted simultaneously by all the carriages (**452**).

To Halt.

3. 1. **Battery**, 2. **HALT.**
tecuted simultaneously by all the carriages (**453**).

To March by the Flank.

4. 1. **By the right (left) flank**, 2. **MARCH.**
ll the carriages simultaneously turn to the right (**455**), the carriages taking the track and distance from the carriages ch precede them in the new formation.

5. If the battery is in line, with closed intervals, the fol- ing modifications **apply**: The movement is successive; the lon on the indicated flank begins the movement; the others : it up in turn so as to follow, at the proper distance, in track of the carriages which precede them. If executed le marching, all the sections except the one on the indicated k halt, and then resume the march so as to follow in their per places in the column.

To March to the Rear.

6. By an about: 1. **Right (left) about**, 2. **MARCH.**
ll the carriages simultaneously turn to the right about 5), the rear carriages taking the track and distance from carriages which precede them in the new formation.

y a countermarch: 1. **Countermarch**, 2. **MARCH.**
The leading carriage of each section executes left about as it described; the rear carriages follow in the track of the ding carriage, and execute a left about on the same ground.

527. If the battery is in line, with closed intervals, t following modifications apply: The captain first comman 1. **Right sections forward**, 2. **MARCH.** The right section of e platoon moves forward so as to clear the left section. If captain orders an increased gait for the maneuver, the ri sections take the gait indicated; if an increased gait is ordered, the left sections reduce the gait 1°, or, if halt they remain halted. As soon as the right sections are cl of the left sections, the captain gives the command for about or the countermarch, which is executed by all sections at the gait of the right sections. On the comple of the about or countermarch, the sections in rear increase gait so as to reach their positions in line.

528. In horse batteries, in executing an about, if the pie are in front, they reduce the gait slightly so as to follow gun squads at 2 yards' distance; if the caissons are in fr they increase the gait slightly on completing the about, so to follow the pieces at 2 yards' distance.

To March Obliquely.

529. 1. **Right (left) oblique**, 2. **MARCH.**

All the carriages simultaneously turn to the oblique (45 The carriages move in parallel lines. The lead drivers al themselves in each rank of carriages; the lead driver of e rear rank carriage also aligns himself upon the lead driver the carriage corresponding to his own in the front rank. these positions are properly maintained, the carriages sho on executing a second oblique in either direction, have t proper distances, intervals, and alignment.

To Change Direction.

530. 1. **Column right (left)**, 2. **MARCH.**

If in section column the leading carriage turns to the ri through an angle of 90°. The carriages in rear follow and t on the same ground.

If in double section or flank column the carriages on t side toward which the turn is made, execute the movement

ore. In each section, as the inside carriage begins the turn, outside carriage increases the gait 1°, preserves its interval n the inside carriage and takes the gait of the latter on ving abreast of it.

olumn half right (left) is similarly executed.

31. Being in line: 1. **Battery right (left) wheel**, 2. **MARCH.**

he pivot section executes column right. The other sections twice executing column half right place themselves on the established by the pivot section.

ule I governs the gait (**519**).

attery right (left) half wheel is similarly executed.

To Execute a Passage of Carriages.

32. Being in line or in section column, to place the rear carges in front: 1. **Pieces (Caissons) front**, 2. **MARCH.**

he carriages designated in the command are the rear carges in the existing formation.

n each section the designated carriage inclines to the right, ses the other carriage, takes position in front of it, and conues the march; the carriage thus placed in rear then folrs at the prescribed distance.

Rule II governs the gaits (**519**).

To Close or Extend Intervals in Line.

33. 1. **On (such) section**, 2. **To (so many) yards**, 3. **Close xtend) intervals**, 4. **MARCH.**

The indicated section moves straight to the front; the other ctions incline toward or away from the indicated section and ve to the front when at the proper interval.

Rule I governs the gaits.

To Form Section Column to the Front from Line.

34. 1. **Right (Left) by section**, 2. **MARCH.**

The right section moves straihgt to the front. The other ctions in turn, change direction to the right and follow in e column at the proper distance .

Rule II governs the gaits.

To Form Line from Section Column.

585. To the front: 1. Right (Left) front into line, 2. MARCH.

The leading section moves straight to the front. Each section in rear obliques to the right until opposite its place in line, when it obliques to the left, moves to the front, and takes its place on the line.

Rule I governs the gaits.

586. To the right (left): 1. Right (Left) into line, 2. MARCH.

The leading section executes **column right** and then moves straight to the front. The other sections move forward and successively execute column right, when, by so doing, they will be opposite their positions in line; they then move to the front and take their places on the line, to the right of the carriage which preceded them.

If, in the execution of the movement, the sections in rear move at a faster gait than the leading section, the second section in the column inclines to the right sufficiently to clear the leading section.

Rule I governs the gaits.

587 On the right (left): 1. On right (left) into line, 2. MARCH.

Executed as prescribed for **right into line**, except that the second section in the column inclines to the **left** in order to clear the leading section, and that each section passes beyond the preceding one before turning to the right; also that the leading section is habitually halted on advancing three carriage lengths after the completion of its charge of direction.

588. To form line at closed intervals, the captain commands **At (so many) yards**, before giving the prescribed commands for forming line; the battery is then formed with the intervals prescribed.

To Form Flank Column from Section Column.

589. 1. **Flank column**, 2. **Right (left) oblique**, 3. **MARCH.**

The rear carriages of all the sections oblique to the right simultaneously, and then oblique to the left, when by so doing

will have their proper intervals from the leading carriages.
arriages in rear of the leading one close upon the carriages
h precede them in the column at the gait of the carriages
h oblique.
ile I governs the gaits.

To Form Line to the Front from Flank Column.

0. 1. Right (Left) front into line, 2. MARCH.
ie carriages on the right of the column execute right front
line, as prescribed for a section column. The carriages on
left move by the right flank, and each forms in section col-
behind the right carriage of its own section.
ule I governs the gaits.

Form Line to the Flank at Closed Intervals from Flank Column.

1. 1. At (so many) yards, 2. Right (left) into line, 3. RCH.
1 each column the carriages execute right into line as pre-
bed for the sections in paragraph 586, each section march-
by the right flank in time to be opposite its place in line.

To Form Section Column from Flank Column.

42. 1. Pieces (Caissons) front, 2. MARCH.
he designated carriage of the leading section moves straight
the front; the other carriage of this section obliques toward
designated carriage in time to follow in its track at the
scribed distance. The remaining sections in the column ex-
te the movement similarly, each carriage moving out in time
follow the preceding one at the proper distance.
Rule II governs the gaits.

To Form Double Section and to Resume the Previous Order.

43. Being in line or in section column: 1. Double section, Right (left) oblique, 3. MARCH.

In each section the rear carriage inclines to the right a places itself abreast of the leading carriage at an interval 2 yards.

If in section column, all carriages in rear of the leading close upon the carriages which precede them in the column the gait of the carriages which incline.

Rule I governs the gaits.

544. To resume the previous order: 1. **Pieces (Caissons) fr** 2. **MARCH.**

If in column, the designated carriage of the leading sect moves straight to the front; the other carriage inclines tow the designated carriage in time to follow in its track at the p scribed distance. The remaining sections in the column exec the movement similarly, each carriage moving out in time follow the preceding one at the proper distance.

If in line, the movement is executed simultaneously by all sections.

Rule II governs the gaits.

545. Being in flank column: 1. **Double section,** 2. **Right (l oblique,** 3. **MARCH.**

In each section the right carriage moves or continues stra to the front, the left one inclines sharply to the right, moves up abreast of the right carriage at 2 yards interval.

Rule I governs the gaits.

546. To resume the previous order: 1. **Flank column, Right (left) oblique,** 3. **MARCH.**

In each section the left carriage moves or continues stra to the front, the left one inclines sharply to the right then moves up abreast of the left carriage at the prescri interval.

Rule I governs the gaits.

547. The section being formed in double section retains t formation until again formed in section or flank column, is maneuvered as if it were a single carriage. In executing turns the pivot carriage executes the movement as heretof prescribed; the other carriage conforms to the movement

pivot carriage, increasing the gait so as to arrive abreast the latter without delay.

The double section line or column is maneuvered as explained the normal order in line or in section column, with the extions made necessary by the difference of formation. The riages retain their relative order until they are again formed the normal order in line, in section column, or in flank coln. The posts of individuals are analogous to those preibed for the order in line or column.

Passage of Obstacles.

548. If, while maneuvering or marching, an obstacle is enntered by any subdivision, its chief, without waiting for lers, gives appropriate commands for avoiding the obstacle l for resuming the original formation as soon as the obstacle passed.

Section IX.—To Subdivide the Battery for Action.

549. Before unlimbering the guns for action, the battery is odivided into firing battery and combat train (478).

550. To subdivide the battery and prepare it for action, the ptain commands: **PREPARE FOR ACTION.**

The carriages of the firing battery are at once prepared for tion, as explained in Firing Instruction. Each chief of plaon inspects his unit and reports to the captain whether or not l parts of the material are in working order. The reconissance officer and the combat-train commander report to the ptain for instructions.

The subdivision is ordinarily effected in rear of the position be occupied. If the guns have to be moved a considerable stance or over rough ground to reach the position, the panomic sights and range quadrants are replaced in their cases, id are again placed in their seats when the position is reached. s the guns are moved forward to their position, the combatain commander posts the combat train under cover in the genal locality indicated by the captain.

The first caisson of the fifth section is habitually unlimbered on the right of the line of guns, the second caisson on the left. Depending upon the nature of the ground and the circumstances of the case, the fifth section may either follow the remainder of the battery toward the position for action and take post under the direction of its chief in the most convenient manner, or, at the subdivision for action, the caissons may take post on the proper flanks of the battery, accompany it to the position, and unlimber simultaneously with the guns. In the absence of special instructions from the captain the chief of the fifth section adopts the measures best suited to the immediate case. One or both caissons may be unlimbered in rear of the line under cover, depending upon the nature of the ground and the character of the action. If practicable, the captain uses the caisson on the windward flank as his observing station.

If it is desired to subdivide the battery without preparing for action the captain gives the necessary instructions.

SECTION X.—TO FORM IN BATTERY AND TO RESUME A MARCH FORMATION.

General Provisions.

551. The double section line and the double section column are the habitual formations preliminary to taking the order of battery. The double section line is adapted to unlimbering for action either to the front or the rear; the double section column, to unlimbering for action to the flank. By suitable maneuvers the battery is placed on the desired ground in the appropriate formation before the commands for unlimbering are given.

552. When unlimbering to fire projectiles, or for the practice of fire discipline, the captain and the chiefs of platoon and section dismount. The captain's horse is held by one of the musicians, the horses of the executive and his assistant by another. Each chief of section passes his reins to the swing driver of his piece; these horses are led off with the limbers, and are returned in like manner on limbering after action.

her individually mounted men habitually dismount when
duties require them to remain with the firing battery.
horses are held under cover.

53. In horse batteries, the cannoneers, except horse holders, ount at the command **Action front** (**rear**, etc.), link their es and run to the carriages. The horse holders follow the ers and post the led horses in rear of the caisson limbers.

54. In active service and in instruction simulating it, the ers are habitually placed under cover in the vicinity of the , and generally on the flank. At ceremonies limbers are ed in rear of their carriages. If the captain desires the ers to be posted under cover, he indicates, before giving the mands for unlimbering, the position they are to take.

55. When posted elsewhere than in rear of the guns, the ers are formed so as to take the best advantage of cover, erally in double section line faced toward the enemy, and h intervals of about 20 yards between limbers of adjacent ions. If unlimbered from line, the limbers of each section cute a left about and move straight to the rear; if from umn, they turn toward the rear of the position. After thus uring the front of the position, they form in double section umn at the command or signal of the first sergeant and are ducted by him to the place designated by the captain, where y are formed right or left into line, as the case may be. If position is to be occupied for a considerable time, the first geant may dismount the drivers and allow them to stand rest.

If the horses are heated and the air is chilly, the teams should put on a circle and walked to cool them out whenever prac- able.

56. If the limbers are posted on the flank of the battery, at command or signal for limbering, they file off from the flank rest the battery and move in section column toward it; on proaching the position, the piece and caisson limbers separate d form in two columns, each column being directed toward e trails of the corresponding carriages.

As soon as the fifth section caissons are limbered, the chief this section assembles his section on the proper flank of t battery and in a formation similar to that of the remain sections of the battery.

557. In unlimbering, the limbers habitually move to th posts at a trot. In limbering, they move at a walk, unless an creased gait is ordered.

558. Before unlimbering effort should be made to place t battery in position so that the guns, when unlimbered, will approximately aligned with uniform intervals.

To Fire to the Front.

559. Being in double section line, the caissons on the left their pieces: **ACTION FRONT.**

Executed as prescribed in paragraph 199.

To Fire to the Rear.

560. Being in double section line, the caissons on the right their pieces: **ACTION REAR.**

Executed as prescribed in paragraph 200.

To Fire to the Flank.

561. Being in double section column, the caissons on eit flank of their pieces: **ACTION RIGHT (LEFT).**

Executed as prescribed in paragraph 201.

To Limber to the Front and Rear, and to March.

562. 1. **Limber,** 2. **FRONT AND REAR.**

Executed as prescribed in paragraph 202.

After limbering to the front and rear, the teams of each s tion face in opposite directions.

563. To march in line: 1. **Pieces (Caissons) front,** 2. **MAR**

The carriages designated move straight to their front; t others execute a right about and quicken the gait so as follow in section column the carriages of their own secti which precede in the movement.

564. To march in column to the flank: 1. Flank column, Pieces by the right (left) flank, 3. MARCH; or, 1. Double tion, 2. Pieces by the right (left) flank, 3. MARCH.

All the carriages move by the flank in the indicated direction, caissons so regulating the gait as to place themselves abreast their pieces in flank column or double section, as the case y be.

To Limber to the Rear, and to March.

565. 1. Limber, 2. REAR.

Executed as prescribed in paragraph 203.

After limbering to the rear, the teams all face in the same ection.

566. To march in line: 1. Pieces (Caissons) front, 2. MARCH.

The carriages designated move straight to the front; the iers follow their proper carriages in section column.

567. To march in column to the flank.

Executed as prescribed in paragraph 564.

To Form Double Section Line After Limbering.

568. 1. Form double section line, 2. MARCH.

If the battery has been limbered front and rear, the caissons and fast; each piece inclines to the right, executes a left out, and places itself in double section on the right of its isson.

If the battery has been limbered rear, the caissons stand fast d each piece moves up and places itself in double section on e left of its caisson.

CHAPTER II.—THE BATTALION MOUNTED.

SECTION I.—ORGANIZATION OF THE BATTALION.

569. The battalion is organized on a war or peace footing as own in the Tables of Organization.

The number and principal duties of the field, staff, and listed men belonging to the battalion section of the Headarters Company are as follows:

WAR FOOTING.

Personnel.	Number.	Remarks.
Major	1	Commands battalion.
Captain	1	Adjutant and reconnoissance officer.
Battalion sergeant major	1	Assistant to adjutant and reconnoissance officer.
Sergeant	1	Agent with regimental commander.
Corporals	5	3 scouts, 1 signaler and telephone operator battalion headquarters, 1 instrument operator.
Bugler	1	Bugler and orderly.
Privates	9	4 scouts, 1 assistant to signal corporal, 3 drivers for reel cart, and 2 orderlies and horseholders.

All the personnel are individually mounted except the drivers and the assistant to the signal corporal (reel-cart operator) and belong to the Headquarters Company.

SECTION II.—FORMATIONS OF THE BATTALION.

570. The normal formations of the battalion are: **The order in line**, the **order in section column**, the **order in flank column** and the **order in battery.**

The individual batteries are formed in each case as heretofore prescribed; and, in each case, the formation of the battalion is analogous thereto.

571. In the normal order, the interval between batteries in line or in battery is twice the interval between the sections of the batteries. The distance between batteries in section column or flank column is carriage length.

572. If the battalion is formed in column, with its batteries each formed in the order in line, the formation is termed **column of batteries.** The distance between the batteries is equal to the battery front, when at full distance; it is carriage length when at closed distance. When the battalion is in column of batteries at closed distances it is said to be **closed in mass.**

3. If the battalion is formed in line with its batteries each ied in the order in section column, or the order in flank nn, the formation is termed **a line of section columns** or **a of flank columns.** Full interval, in this case, is such as ld result if the batteries had executed a simultaneous ige of direction to the right or left from a formation of the alion in the order in section column or the order in flank mn; closed interval is carriage length or such as the major prescribe.

74. At formations of the battalion, batteries habitually take r places from right to left in line, from front to rear in mn, in the order of rank of their captains.

atteries whose captains are absent take their places in line olumn according to the relative rank of the officers present ommand of them. A battery whose captain is absent for w days only retains its place, according to the rank of the ain, unless otherwise ordered by the major.

fter the formation of the battalion no cognizance is taken he relative order of the batteries. On marches the order of batteries in column is varied from day to day.

SECTION III.—POSTS OF INDIVIDUALS.

75. At ceremonies the major is opposite the center and 30 is in front of the line of captains if in line, or in front of captain of the leading battery if in column. On other occa- s he places himself where he can most readily observe and ct his battalion. The commissioned staff is posted two yards ear of the major in order of rank from right to left. The eant major, the noncommissioned agents and scouts, and signaler, when the battalion reel cart is not present, are ned in line in the order given from right to left, two yards in of the commissioned staff. The bugler, the mounted or- lies, and the privates of the headquarters company, in the er named from right to left, are in line two yards in rear of noncommissioned officers. The battalion reel cart is posted yards to the left of and with the heads of the lead horses

in line with those of the noncommissioned officers. The poral signaler is boot to boot with the lead driver. The p is abreast of and two yards outside of the left rear wh the cart.

SECTION IV.—TO FORM THE BATTALION.

576. To form the battalion in line, the adjutant caus jutant's call to be sounded; the adjutant and sergeant proceed to the selected ground and post themselves facing other a few yards outside the points where the right an of the right battery of the battalion are to rest.

The batteries approach the line from the rear and are in succession from right to left by their captains, so tha heads of the lead horses will be on the line established b adjutant and sergeant major. After halting his battery, captain aligns it toward the right (**579**).

When the battery that arrives first on the line has be tablished, the sergeant major joins the battalion noncom sioned staff.

The line being formed, the major and his staff take post the center of the battalion. The adjutant then moves at or gallop by the shortest line to a point midway betwee major and the center of the battalion, halts, facing the salutes with the hand, and reports: **Sir, the battalion is f**

The major returns the salute with the hand.

The adjutant then takes his post with the battalion staf

577. The battalion may also be assembled in any othe venient formation. In such cases, as soon as the last b has taken its place, the adjutant joins the major and r to him that the battalion is formed.

578. Officers draw and return saber with the major. ceremonies, sabers are habitually drawn.

579. To align the battalion.—To effect a general alignm the major causes one of the flank batteries to be established the desired position, and commands: 1. **By battery,** 2. **Ri (Left);** 3. **DRESS.**

ach captain, in turn, commencing with the battery first ted, aligns his battery (520) toward the flank designated, commands **Front** when the alignment is complete.

he captain and first sergeant of the battery first established erintend the alignment from the flank of their battery near- the point of rest. The captain and first sergeant of each of other batteries superintend the alignment from the flank heir battery farthest from the point of rest.

80. To dismiss the battalion.—The major commands: **Dismiss r batteries**, or sends appropriate instructions to the captains. ch captain marches his battery to its park and dismisses it.

SECTION V.—MANEUVERS OF THE BATTALION.

581. To reach the position for action at the proper time and occupy it skillfully are the objects to be aimed at in training maneuver.

The actual occupation of the position is not, as a rule, effected a formal maneuver of the battalion as such, but rather by separate movement of the individual batteries to the posi- ns assigned them, to the end that all possible advantage may taken of the cover and concealment afforded by the ground.

Formal maneuvers of the battalion, as such, are consequently limited application.

For passing from one formation to another, and for the simple olutions requisite for ceremonies and the ordinary incidents service, the battalion is maneuvered in accordance with the inciples heretofore prescribed for a single battery and by nilar commands. In the case of simultaneous movements, ch as marching to the front, to the flank, to the rear, obliquely, ., the command or signal of execution of the major is im- diately repeated by the captains and simultaneously executed the batteries. In the case of successive movements, the ptains maneuver their batteries so as to cause them to arrive their proper positions by the shortest route and in conformity th the principles of the rules of gaits (519).

582. The commands of the major are transmitted by cou- rs, or given by arm, saber, or bugle signals, or by word of

In each section the rear carriage inclines to the right a places itself abreast of the leading carriage at an interval 2 yards.

If in section column, all carriages in rear of the leading c close upon the carriages which precede them in the column the gait of the carriages which incline.

Rule I governs the gaits.

544. To resume the previous order: 1. **Pieces (Caissons) fo** 2. **MARCH.**

If in column, the designated carriage of the leading sect moves straight to the front; the other carriage inclines tow the designated carriage in time to follow in its track at the scribed distance. The remaining sections in the column exe the movement similarly, each carriage moving out in time follow the preceding one at the proper distance.

If in line, the movement is executed simultaneously by all sections.

Rule II governs the gaits.

545. Being in flank column: 1. **Double section,** 2. **Right (l oblique,** 3. **MARCH.**

In each section the right carriage moves or continues stra to the front, the left one inclines sharply to the right, moves up abreast of the right carriage at 2 yards interval.

Rule I governs the gaits.

546. To resume the previous order: 1. **Flank column Right (left) oblique,** 3. **MARCH.**

In each section the left carriage moves or continues stra to the front, the left one inclines sharply to the right then moves up abreast of the left carriage at the prescr interval.

Rule I governs the gaits.

547. The section being formed in double section retains formation until again formed in section or flank column, is maneuvered as if it were a single carriage. In executing turns the pivot carriage executes the movement as hereto prescribed; the other carriage conforms to the movemen

pivot carriage, increasing the gait so as to arrive abreast the latter without delay.

The double section line or column is maneuvered as explained the normal order in line or in section column, with the exions made necessary by the difference of formation. The riages retain their relative order until they are again formed the normal order in line, in section column, or in flank coln. The posts of individuals are analogous to those preibed for the order in line or column.

Passage of Obstacles.

548. If, while maneuvering or marching, an obstacle is enntered by any subdivision, its chief, without waiting for ers, gives appropriate commands for avoiding the obstacle l for resuming the original formation as soon as the obstacle assed.

Section IX.—To Subdivide the Battery for Action.

549. Before unlimbering the guns for action, the battery is divided into firing battery and combat train (478).

550. To subdivide the battery and prepare it for action, the tain commands: **PREPARE FOR ACTION.**

The carriages of the firing battery are at once prepared for ion, as explained in Firing Instruction. Each chief of platn inspects his unit and reports to the captain whether or not parts of the material are in working order. The reconssance officer and the combat-train commander report to the tain for instructions.

The subdivision is ordinarily effected in rear of the position be occupied. If the guns have to be moved a considerable tance or over rough ground to reach the position, the panoic sights and range quadrants are replaced in their cases, l are again placed in their seats when the position is reached. the guns are moved forward to their position, the combatin commander posts the combat train under cover in the genl locality indicated by the captain.

The first caisson of the fifth section is habitually unlimbered on the right of the line of guns, the second caisson on the left. Depending upon the nature of the ground and the circumstances of the case, the fifth section may either follow the remainder of the battery toward the position for action and take post under the direction of its chief in the most convenient manner, or, at the subdivision for action, the caissons may take post on the proper flanks of the battery, accompany it to the position, and unlimber simultaneously with the guns. In the absence of special instructions from the captain the chief of the fifth section adopts the measures best suited to the immediate case. One or both caissons may be unlimbered in rear of the line under cover depending upon the nature of the ground and the character of the action. If practicable, the captain uses the caisson on the windward flank as his observing station.

If it is desired to subdivide the battery without preparing for action the captain gives the necessary instructions.

SECTION X.—TO FORM IN BATTERY AND TO RESUME A MARCH FORMATION.

General Provisions.

551. The double section line and the double section column are the habitual formations preliminary to taking the order of battery. The double section line is adapted to unlimbering for action either to the front or the rear; the double section column, to unlimbering for action to the flank. By suitable maneuvers the battery is placed on the desired ground in the appropriate formation before the commands for unlimbering are given.

552. When unlimbering to fire projectiles, or for the practice of fire discipline, the captain and the chiefs of platoon and section dismount. The captain's horse is held by one of the musicians, the horses of the executive and his assistant by the other. Each chief of section passes his reins to the swing driver of his piece; these horses are led off with the limbers, and are returned in like manner on limbering after action.

ther individually mounted men habitually dismount when r duties require them to remain with the firing battery. horses are held under cover.

53. In horse batteries, the cannoneers, except horse holders, nount at the command **Action front (rear, etc.)**, link their ses and run to the carriages. The horse holders follow the ers and post the led horses in rear of the caisson limbers.

54. In active service and in instruction simulating it, the ers are habitually placed under cover in the vicinity of the s, and generally on the flank. At ceremonies limbers are ed in rear of their carriages. If the captain desires the ers to be posted under cover, he indicates, before giving the mands for unlimbering, the position they are to take.

55. When posted elsewhere than in rear of the guns, the ers are formed so as to take the best advantage of cover, erally in double section line faced toward the enemy, and 1 intervals of about 20 yards between limbers of adjacent ions. If unlimbered from line, the limbers of each section cute a left about and move straight to the rear; if from mn, they turn toward the rear of the position. After thus ring the front of the position, they form in double section mn at the command or signal of the first sergeant and are ducted by him to the place designated by the captain, where r are formed right or left into line, as the case may be. If position is to be occupied for a considerable time, the first geant may dismount the drivers and allow them to stand est.

the horses are heated and the air is chilly, the teams should out on a circle and walked to cool them out whenever practible.

56. If the limbers are posted on the flank of the battery, at command or signal for limbering, they file off from the flank rest the battery and move in section column toward it; on roaching the position, the piece and caisson limbers separate form in two columns, each column being directed toward trails of the corresponding carriages.

As soon as the fifth section caissons are limbered, the chief this section assembles his section on the proper flank of t battery and in a formation similar to that of the remain sections of the battery.

557. In unlimbering, the limbers habitually move to th posts at a trot. In limbering, they move at a walk, unless an creased gait is ordered.

558. Before unlimbering effort should be made to place t battery in position so that the guns, when unlimbered, will approximately aligned with uniform intervals.

To Fire to the Front.

559. Being in double section line, the caissons on the left their pieces: **ACTION FRONT.**

Executed as prescribed in paragraph 199.

To Fire to the Rear.

560. Being in double section line, the caissons on the right their pieces: **ACTION REAR.**

Executed as prescribed in paragraph 200.

To Fire to the Flank.

561. Being in double section column, the caissons on eit flank of their pieces: **ACTION RIGHT (LEFT).**

Executed as prescribed in paragraph 201.

To Limber to the Front and Rear, and to March.

562. 1. **Limber,** 2. **FRONT AND REAR.**

Executed as prescribed in paragraph 202.

After limbering to the front and rear, the teams of each tion face in opposite directions.

568. To march in line: 1. **Pieces (Caissons) front,** 2. **MA**

The carriages designated move straight to their front; others execute a right about and quicken the gait so as follow in section column the carriages of their own sect which precede in the movement.

64. **To march in column to the flank: 1. Flank column, ieces by the right (left) flank, 3. MARCH; or, 1. Double ion, 2. Pieces by the right (left) flank, 3. MARCH.**
ll the carriages move by the flank in the indicated direction, caissons so regulating the gait as to place themselves abreast heir pieces in flank column or double section, as the case ; be.

To Limber to the Rear, and to March.

65. 1. **Limber, 2. REAR.**
xecuted as prescribed in paragraph **203.**
fter limbering to the rear, the teams all face in the same ction.

66. **To march in line: 1. Pieces (Caissons) front, 2. MARCH.**
he carriages designated move straight to the front; the ers follow their proper carriages in section column.

67. **To march in column to the flank.**
xecuted as prescribed in paragraph **564.**

To Form Double Section Line After Limbering.

68. 1. **Form double section line, 2. MARCH.**
f the battery has been limbered front and rear, the caissons nd fast; each piece inclines to the right, executes a left ut, and places itself in double section on the right of its sson.
f the battery has been limbered rear, the caissons stand fast each piece moves up and places itself in double section on left of its caisson.

CHAPTER II.—THE BATTALION MOUNTED.

SECTION I.—ORGANIZATION OF THE BATTALION.

69. The battalion is organized on a war or peace footing as wn in the **Tables of Organization.**
he number and principal duties of the field, staff, and sted men belonging to the battalion section of the Head-rters Company are as follows:

WAR FOOTING.

Personnel.	Number.	Remarks.
Major	1	Commands battalion.
Captain	1	Adjutant and reconnoissance officer.
Battalion sergeant major	1	Assistant to adjutant and reconnoissance cer.
Sergeant	1	Agent with regimental commander.
Corporals	5	3 scouts, 1 signaler and telephone operator battalion headquarters, 1 instrument op ator.
Bugler	1	Bugler and orderly.
Privates	9	4 scouts, 1 assistant to signal corporal, 2 dr ers for reel cart, and 2 orderlies and ba holders.

All the personnel are individually mounted except the drive and the assistant to the signal corporal (reel-cart operato and belong to the Headquarters Company.

SECTION II.—FORMATIONS OF THE BATTALION.

570. The normal formations of the battalion are: **The or in line**, the **order in section column**, the **order in flank colum** and the **order in battery.**

The individual batteries are formed in each case as heretofo prescribed; and, in each case, the formation of the battalion analogous thereto.

571. In the normal order, the interval between batteries line or in battery is twice the interval between the sections the batteries. The distance between batteries in section colu or flank column is carriage length.

572. If the battalion is formed in column, with its batteri each formed in the order in line, the formation is termed **column of batteries.** The distance between the batteries equal to the battery front, when at full distance; it is carria length when at closed distance. When the battalion is column of batteries at closed distances it is said to be clos **in mass.**

3. If the battalion is formed in line with its batteries each
ed in the order in section column, or the order in flank
nn, the formation is termed **a line of section columns** or **a**
of flank columns. Full interval, in this case, is such as
d result if the batteries had executed a simultaneous
ge of direction to the right or left from a formation of the
alion in the order in section column or the order in flank
nn; closed interval is carriage length or such as the major
prescribe.

14. At formations of the battalion, batteries habitually take
r places from right to left in line, from front to rear in
mn, in the order of rank of their captains.

atteries whose captains are absent take their places in line
olumn according to the relative rank of the officers present
ommand of them. A battery whose captain is absent for
w days only retains its place, according to the rank of the
ain, unless otherwise ordered by the major.

fter the formation of the battalion no cognizance is taken
he relative order of the batteries. On marches the order of
batteries in column is varied from day to day.

SECTION III.—POSTS OF INDIVIDUALS.

15. At ceremonies the major is opposite the center and 30
ds in front of the line of captains if in line, or in front of
captain of the leading battery if in column. On other occa-
ns he places himself where he can most readily observe and
ct his battalion. The commissioned staff is posted two yards
rear of the major in order of rank from right to left. The
geant major, the noncommissioned agents and scouts, and
signaler, when the battalion reel cart is not present, are
med in line in the order given from right to left, two yards in
r of the commissioned staff. The bugler, the mounted or-
lies, and the privates of the headquarters company, in the
ler named from right to left, are in line two yards in rear of
noncommissioned officers. The battalion reel cart is posted
yards to the left of and with the heads of the lead horses

in line with those of the noncommissioned officers. The c
poral signaler is boot to boot with the lead driver. The pri
is abreast of and two yards outside of the left rear wheel
the cart.

SECTION IV.—TO FORM THE BATTALION.

576. To form the battalion in line, the adjutant causes
jutant's call to be sounded; the adjutant and sergeant ma
proceed to the selected ground and post themselves facing e
other a few yards outside the points where the right and
of the right battery of the battalion are to rest.

The batteries approach the line from the rear and are pos
in succession from right to left by their captains, so that
heads of the lead horses will be on the line established by
adjutant and sergeant major. After halting his battery, e
captain aligns it toward the right (**579**).

When the battery that arrives first on the line has been
tablished, the sergeant major joins the battalion noncomm
sioned staff.

The line being formed, the major and his staff take post fac
the center of the battalion. The adjutant then moves at a t
or gallop by the shortest line to a point midway between
major and the center of the battalion, halts, facing the ma
salutes with the hand, and reports: **Sir, the battalion is form**

The major returns the salute with the hand.

The adjutant then takes his post with the battalion staff.

577. The battalion may also be assembled in any other c
venient formation. In such cases, as soon as the last batt
has taken its place, the adjutant joins the major and repo
to him that the battalion is formed.

578. Officers draw and return saber with the major.
ceremonies, sabers are habitually drawn.

579. To align the battalion.—To effect a general alignm
the major causes one of the flank batteries to be established
the desired position, and commands: 1. **By battery,** 2. **Ri**
(Left); 3. **DRESS.**

Each captain, in turn, commencing with the battery first ted, aligns his battery (520) toward the flank designated, l commands **Front** when the alignment is complete.

The captain and first sergeant of the battery first established erintend the alignment from the flank of their battery near- the point of rest. The captain and first sergeant of each of other batteries superintend the alignment from the flank their battery farthest from the point of rest.

580. **To dismiss the battalion.**—The major commands: **Dismiss ir batteries**, or sends appropriate instructions to the captains. ch captain marches his battery to its park and dismisses it.

Section V.—Maneuvers of the Battalion.

581. To reach the position for action at the proper time and occupy it skillfully are the objects to be aimed at in training maneuver.

The actual occupation of the position is not, as a rule, effected a formal maneuver of the battalion as such, but rather by separate movement of the individual batteries to the posi- ns assigned them, to the end that all possible advantage may taken of the cover and concealment afforded by the ground.

Formal maneuvers of the battalion, as such, are consequently limited application.

For passing from one formation to another, and for the simple olutions requisite for ceremonies and the ordinary incidents service, the battalion is maneuvered in accordance with the inciples heretofore prescribed for a single battery and by ilar commands. In the case of simultaneous movements, ch as marching to the front, to the flank, to the rear, obliquely, ., the command or signal of execution of the major is im- diately repeated by the captains and simultaneously executed the batteries. In the case of successive movements, the ptains maneuver their batteries so as to cause them to arrive their proper positions by the shortest route and in conformity th the principles of the rules of gaits (519).

582. The commands of the major are transmitted by cou- rs, or given by arm, saber, or bugle signals, or by word of

mouth. The captains habitually repeat the commands of major, or give such commands as may be necessary to ins the execution of the movement. Their commands are given arm or saber signal, or by word of mouth. The whistle, not the bugle, is habitually used to attract attention to signals of the captain during the evolutions of the battalion.

CHAPTER III.—THE REGIMENT MOUNTED.

SECTION I.—ORGANIZATION OF THE REGIMENT.

583. The regiment is organized on a war or peace footin shown in the **Tables of Organization.**

The numbers and principal duties of the field, staff, enlisted men belonging to the regimental section of the H quarters Company are as follows:

WAR FOOTING.

Personnel.	Number.	Remarks.
Colonel	1	Commands regiment.
Lieutenant colonel	1	Such duties as may be assigned him b colonel.
Captains	3	1 adjutant and reconnoissance officer, 1 termaster, 1 commissary.
Chaplain	1	
Veterinarians	2	
Sergeant major	1	Assistant to adjutant and reconnois officer.
Color sergeants	2	
Sergeant bugler	1	Orderly and bugler for regimental com der.
Sergeants	2	1 in charge of scouts, 1 signaler and tele operator at regimental headquarters.
Corporals	4	2 scouts, 1 instrument operator, 1 signa poral.
Mechanics	5	2 horseshoers, 1 saddler, 2 mechanics.
Privates	9	4 scouts, 1 assistant to signal serge drivers, and 2 orderlies and horsehold
Bugler	1	Bugler and orderly.

All the personnel are individually mounted except the drive and the assistant to the signal sergeant (reel-cart operato and belong to the Headquarters Company.

SECTION II.—FORMATION OF THE REGIMENT.

4. The formations of the regiment are similar to those of attalion, the intervals and distances between battalions normally twice those between batteries.

5. If the regiment is formed in line with its battalions in column of batteries closed in mass, the formation is ed a **line of masses.** The normal interval between bat-ns in this case is two carriage lengths.

6. At formations of the regiment, battalions normally take places from right to left in line, from front to rear in mn, in the order of rank of the battalion commanders. ttalions, whose permanent commanders are absent, take places in line or column according to the relative rank of officers present in command of them. A battalion whose anent commander is absent for a few days only retains its l place unless otherwise ordered by the regimental com-der.

ter the formation of the regiment no cognizance is taken ne relative order of the battalions.

SECTION III.—POSTS OF INDIVIDUALS.

37. At ceremonies the colonel is 60 yards in front of his regi-t, opposite the center. On other occasions he is where he best observe and direct his regiment.

he lieutenant colonel is on the right of the commissioned f; during field movements and on the march he is not re-ted to any particular post; the commissioned staff is two ls in rear of the colonel, the adjutant on the right, the others rder of rank from right to left.

he noncommissioned staff, the headquarters detachment, and reel cart are posted as prescribed in paragraph (575).

SECTION IV.—TO FORM THE REGIMENT.

88. The battalion commanders are notified as to the time, ce, and order of formation of the regiment. Each forms his

battalion at the time and place designated, and in the or prescribed.

For line formations the adjutant indicates to the major of first battalion the point of rest and the line on which the r ment is to be established; he then takes post about 30 yards front of the center of the regiment.

The line being formed, the colonel, the lieutenant colo staff, etc., take post facing the center of the regiment.

The adjutant then brings the regiment to attention, if already at attention, faces the colonel, salutes with the h and reports: **Sir, the regiment is formed;** the colonel ret the salute with the hand. The adjutant then takes post the regimental staff.

The regiment may also be formed in any other conve formation; in such cases, as soon as the last battalion taken its place the adjutant joins the colonel and reports him that the regiment is formed.

SECTION V.—MANEUVERS OF THE REGIMENT.

589. The colonel causes his commands to be transmitted the battalion commanders, and the latter maneuver their talions according to the principles heretofore prescribed, s to place them in the desired formation at the proper time place.

The commands of the colonel may be given by a bugle, signals, or voice, but as a rule they are conveyed by couriers.

Part V.

CARE, CONDITIONING, AND TRAINING OF HORSES.

CHAPTER I.—GENERAL PRINCIPLES.

)0. It is essential that the field artillery officer have a ough and practical knowledge of how to care for, condition, train the horses under his charge. Herein lies his chief ie as a horseman. Deficiency in this knowledge will result eedless and avoidable wastage of horses in time of war.

horse requires intelligent care in order that his health and ngth may be preserved; he must be in hard and physically ondition, else the amount of useful work he is able to per- n will be greatly reduced and his power of resistance to ury and disease lowered; and he requires careful training in er that he may work intelligently and obediently and with minimum expenditure of muscular and nervous energy.

)fficers should make themselves thoroughly acquainted with natural history and physiology of the horse, and with the ects of different methods of treatment, changes of diet, etc., on his system and powers of endurance.

They should have a familiar knowledge of the symptoms and thods of treatment of diseases that are common to horses, at to do in emergencies, and a good knowledge of the effects the medicines issued. They should also possess a practical derstanding of the principles of horseshoeing.

An officer in charge of horses must carefully instruct his men the treatment, stabling, management, watering, feeding, ooming, and exercising of the horses, and by continuous super- sion and inspection assure himself that his instructions are oroughly understood and fully carried out.

CHAPTER II.—CARE AND CONDITIONING OF HORSES

SECTION I.—RULES FOR THE CARE OF HORSES.

591. All drivers and all individually mounted men will b taught and must thoroughly understand the following rules f the care of horses:

Horses are nervous animals, and for that reason requi gentle and quiet treatment. Docile but bold horses are apt t retaliate upon those who abuse them, while persistent kindn often reclaims vicious animals.

Before entering a horse's stall and when coming up behi him speak to him gently, then approach quietly and witho sudden or abrupt movement.

A horse must never be struck or threatened about the he Such treatment quickly makes him head shy and renders h proper control difficult and exasperating.

Never kick, strike, or otherwise abuse a horse. On r occasions punishment may be necessary, but it must be a ministered immediately after the offense has been committ and then only in a proper manner with whip or spur and ne in the heat of anger.

Before taking a horse out carefully examine him to make su that he is fit for work.

1. See if he has eaten his food, especially his grain.

2. See if his breathing is normal; that is, quiet and witho distended nostrils.

3. See that he is not resting a fore leg, a sure indication th something is wrong with it.

4. Note whether his droppings are normal.

5. Look him over, especially on the back and the shoulde to see that there are no sores, lumps, or injuries to be rubb and irritated by harness or saddlery.

6. Clean out his feet; see that there are no stones or nails them; and see that his shoes are tight. A loose shoe great increases the concussion on the foot.

7. See if the horse goes lame on leading him out.

ve the horse an opportunity to drink before leaving the
et line or stable and before putting the bit in his mouth.
cold weather warm the bit by blowing and rubbing it
re putting it in the horse's mouth.
taking a horse out, always walk him the first mile to start
circulation in his legs. Habitual disregard of this rule
s to foot and leg troubles that will render the horse un-
iceable before his time.
lways walk the last mile, or farther if necessary, to bring
horse in cool and breathing naturally.
o be certain of no ill effects, a horse brought to the stable in
ated condition must be cooled out and dried before he is left
up in his stall. To cool the horse walk him about slowly
er a blanket if the air is chilly. Occasionally interrupt the
king by giving him a good brisk rub-down and two or three
llows of water. Walking is especially valuable, because this
le exercise keeps the muscles moving slowly and so assists
vorking any excess of blood out of them and out of his vital
ans. The brisk rubbing dries him and assists in bringing
blood back to the skin, and so aids in restoring the circula-
n to the normal. If the surface of the body becomes chilled
if the cooling out is too sudden the congestion existing in the
gs or in the feet may not be relieved, and pneumonia, laminiti
or other troubles will then result. A sudden stoppage of
d work is always bad for the feet and is very liable to result
laminitis. The water given in small quantities slowly cools
horse internally and so aids in sending the blood back to
surface and restoring the normal circulation and tempera-
e. **The cooling-out process must always be a gradual one.**
throw water on any part of a heated horse is particularly
ngerous.
Except as directed in the preceding paragraph, never water
horse when heated unless the exercise or march is to be re-
med immediately; if the exercise or march is to be resumed at
ce water will be of the greatest benefit to the horse, no matter
w heated he may be. But a horse should not be called upon
do fast work for at least a half hour after a big drink.

Never feed grain to a horse when heated or fatigued. Gr is a highly concentrated food that requires high digestive pow Abnormal temperature impairs the power of the digestive gans. If the animal has been worked to the point of fati all bodily functions are for a time injuriously affected. that reason he must be rested and his normal digestive po restored before concentrated food of any kind is given to h On the other hand, hay, being a bulky food, will not hurt a h however heated or fatigued he may be.

Never remove the saddle and blanket in such a way as expose a wet back either to the hot rays of the sun or t sudden cooling. The pressure of the saddle restricts the b supply and so weakens the tissues of the back. In this co tion a hot sun more readily burns or inflames the skin, whil sudden cooling contracts the blood vessels and prevents proper return of the blood to nourish the tissues. In either c sores and swellings may result.

When the saddle is removed the back should be prom rubbed and massaged to dry it and restore the circulation. this is impossible the next best thing is to replace the bla with the dry sides next to the skin and again put on the sad girthing it loosely.

After a long or hard march it is necessary to restore the culation in the back very gradually, or sores and swellings liable to result. To do this the girth should be slightly loose and the saddle allowed to remain on the back for 15 or minutes. The more gradually the circulation can be resto the less severe will be the pain and swelling.

In hot weather, especially on the march, it is very refresh to the horse to have his eyes, nostrils, dock, and the inside his hind quarters sponged with cool water.

When the horse comes in wet with rain he should be scra then blanketed and his head, neck, loins, and legs rubbed. the weather is cold an extra blanket should be put on for minutes. The wet blanket should be changed when the h dries.

not wash the legs. This practice is one of the surest means causing scratches. The legs should be rubbed dry and banded loosely with thick bandages. Strips of gunny sacks are satisfactory for this purpose. It is far more important to have the legs warm and dry than clean. The best method of treating muddy legs in order to avoid scratches is to bandage them to keep them warm until they are dry and then brush them clean. Never leave a horse for the night until he is thoroughly clean, especially around his legs, pasterns, and feet.

Individual men returning from mounted duty or pass will report their return to the stable sergeant, who will inspect each horse and see that he is properly cared for.

SECTION II.—STABLES AND STABLE MANAGEMENT.

592. A lieutenant of the battery is responsible to the captain for all duties in connection with the care of the horses, with the stables, and with the stable management (**32**). He is assisted by the stable sergeant who takes immediate charge of the stables, picket line and paddock, forage, and stable property in general.

The stable sergeant is responsible that the stables and their surroundings are kept at all times thoroughly policed and free from odors; he is usually assisted by one or more stable orderlies.

Sufficient men are detailed as stable police to perform the general police and to remove all manure as it is dropped, either in the stables, on the picket line, or in the paddocks, during the day. The stable police also assist in the feeding, watering, and bedding of the horses.

593. Foul air and dampness are the causes of many diseases of the horse; hence the importance and economy of spacious, clean, dry, and well-ventilated stables.

It is impossible to give the horse too much fresh air even in the coldest weather. Stable windows should be closed only when it is necessary to prevent rain or snow from beating in on the animals. The stables should be considered as merely a shelter

from storms. The more nearly the air of the stables approach the purity and temperature of the outside air, the more nea are the stables adapted to the health and comfort of t animals.

A practical and satisfactory test that a stable is prope cleaned and ventilated is that, on entering it, the sense smell detects no apparent change from the air outside.

594. The picket line should be established in the immedi vicinity of the stables. The floor of the picket line should raised and trenches to carry off the rain should be provided that the ground upon which the horses stand may be kept d

A horse prefers to stand with his fore feet lower than h hind feet, as this rests and relieves his tendons. Where hor are required to stand for long periods on the picket line t floor should be constructed so that this is possible.

Paddocks, with shade and water, should be provided near t stables; if there is no shade, shelter from the sun should extemporized. The picket line and paddock should be sprinkl to keep down the dust; crude oil may be used to advanta Racks for drying bedding should be provided near each stab

The horses are assigned stalls and places on the picket line sections, as nearly as practicable according to their usual pla in the battery. The name and hoof number of the horse s posted over his place in the stall. Over the middle of ea double stall occupied by a driver's pair are displayed the numb of the section, the carriage, and the position of the pair in t team, as: **First: Piece: Wheel**, or, **Fifth: Second Caisson, Swin**

595. Manure or foul litter must not be allowed to accumula in or near the stables but must be carried to the manure he daily.

In the morning stalls are cleaned and the stables polish under the direction of the stable sergeant, assisted by the chie of sections.

The bedding is taken up, carefully shaken out, and assorte All parts of the bedding which can be used again are taken t the bedding racks and spread thereon for a thorough dryin parts which can not be used again are sent to the manure he

al attention is necessary in this matter, as the allowance raw, 100 pounds per month per animal, is insufficient under favorable conditions. In the evening the dried bedding, d with such fresh bedding as may be necessary, is laid ı. The bed must be soft and even with the thickest part rd the manger.

practicable, all woodwork within reach of the horses ld be protected with sheet metal or painted with a thin coat ıs tar; other woodwork and brick should be painted a light e and then kept clean and free from dust.

ed boxes must be kept clean; they should be washed from to time with dilute vinegar and always after feeding bran ı or other soft food.

ıring the day, except in very cold or stormy weather, the es, when not being used or fed, should stand at the picket or in the paddocks. In hot climates, however, if there is sufficient shade on the picket line or in the paddocks, it is er to keep the horses in the stables during the heat of the

noking in the stables is prohibited.

ne or more covered lights should be provided in the stables ight.

Feeding.

96. Three principles should be adhered to in feeding:

Water a thirsty horse before feeding him.

Feed in small quantities and often.

Do not work a horse hard immediately after a full feed.

97. The water which a horse drinks passes almost immediy from his stomach into the small intestines and thence, in course of a few minutes, to the caecum or blind gut, which the reservoir from which it is absorbed and used by the se as needed. To water a thirsty horse immediately after has eaten causes a considerable portion of the contents of stomach to be carried with the water into the intestines. As onsequence digestion is incomplete, there is avoidable loss of ırishment, and indigestion or colic may result.

598. The digestive organs of the horse are arranged to ad of leisurely feeding for long periods at a time. Thus a h will graze 22 out of 24 hours. The fact that the stomach o horse is small, the capacity of the functional stomach be only about 1¼ gallons, points to the necessity for frequent fe ing in small quantities. The intestines, on the other hand, very large and require a considerable bulk of forage to fill th If bulk is withheld, horses will eat quantities of earth or s or otherwise become depraved in appetite to fill up the w A horse will not thrive if bulk of forage in the form of hay other good roughage is not supplied him, even if highly nu tive food is given in abundant quantities.

A horse requires, roughly, about 2½ pounds of provender d for each 100 pounds of live weight; that is, about 25 pou for a 1,000-pound horse. Of this amount the proportion grain to hay should depend upon the severity of his wo When the work is very light one-third of the allowance sho be grain and two-thirds hay; when the work is very heavy t thirds should be grain and one-third hay. The proport varies between these limits according to the amount of w the horse is doing.

The daily allowance of oats, barley, or corn is 12 pounds, of hay 14 pounds for each light artillery horse. It is 14 pou of grain and 17 pounds of hay for each field artillery horse of heavy draft type weighing 1,300 pounds or more. Substituti of hay for grain or grain for hay are authorized, so that garrison the horses of an organization may at all times properly fed in accordance with the severity of their work.

The best substitute for the slow, continuous feeding natu to the horse is regular and frequent feeding. The value regularity is abundantly proven by experience. The digest organs become organs of habit, and perform their functions b if called upon to work at fixed and regular times. If not limi by other important considerations, five feeds daily would better than three, the first one being not later than 6 a. m. a the last at 11 p. m., the other three so that the intervals

ı feeds are as nearly equal as the work may permit. In ervice such frequent feeding is impracticable.

illery horses should be fed at least three times a day, at lle, in the middle of the day, and at night. Ordinarily hird of the grain ration is fed each time. Hay, if the s are to work, is not fed in the morning, but about one- of the ration should be fed at noon and the remainder at

9. Immediately after a full feed the stomach and bowels listended. If hard work is given at once they press against ungs and impede their power of expansion, thus leading to ing and distress. Fast work should therefore be avoided a full feed. Moreover, though such work rarely results in , it interferes with digestion to such an extent that loose- of the bowels occurs and the food passes through undi- ed and is wasted. Food remains in the stomach about 1½ s. Fast or heavy work should therefore be deferred for 1 1½ to 2 hours after a full feed.

0. A bran mash acts as a mild laxative and should be fed or twice a week to stabled horses. A little dry bran mixed ı the oats is of value in compelling more thorough mastica- and prevents greedy animals from bolting their grain. In ng or early summer the animals should be grazed daily n practicable. A lump of salt should be kept in each ger.

efore feeding hay it should be thoroughly shaken out with rk so as to get rid of dust and seed; it is also advisable to sten the hay before giving it to the horse. The grain, if sible, should be run over wire screens or allowed to fall ugh the air to remove dust.

t is advisable to feed at least a portion of the allowance of before feeding the grain.

rain should never be fed or placed in the mangers until it ertain that the horses are thoroughly cool.

n the morning horses are usually fed at or before reveille. e noon feed of hay is usually placed in the mangers while

the organization is at drill, but the grain is not fed until horses are thoroughly cool. The evening feed is placed in mangers after the stables have been thoroughly policed for night.

All horses do not require the same amount of forage; amount given each horse must be based, therefore, upon individual requirements.

When forage can not be obtained, grazing should be requ at every spare moment, especially early in the morning w dew is on the grass, but not if it is covered with frost.

All forage should be inspected by the lieutenant in charg see that it is up to weight and contract specifications. A for book, showing daily entries of all forage drawn, fed, and maining on hand, together with the number of the public private animals fed, will be kept by the stable sergeant checked daily by the lieutenant in charge. All officers sh be familiar with the characteristics of good forage and the m ner in which it is commercially graded for contract specifi tions. To obtain this knowledge, officers should be encour to visit large commercial stables.

Barley possesses a husk so tough and indigestible that should always be crushed before being fed, else a very gr part of its nutrient value is lost.

Sudden changes in food are to be avoided. The digestive gans are frequently unable to accommodate themselves to a s den change and scouring, constipation, or colic may result. sudden changes become necessary, the ration of the new fo should be greatly reduced and then increased gradually to full requirements.

Good oats weigh about 40 pounds to the bushel; barley ab 48 pounds; corn about 56 pounds. Pressed hay weighs about pounds per cubic foot.

The standard bushel in the United States contains 2.15 cubic inches. A cubic yard contains 21.69 bushels. A box by 16.8 by 8 inches holds 1 bushel; a box 12 by 11.2 by 8 inc holds half a bushel; a box 8 by 8 by 8.4 inches holds 1 pe a box 8 by 8 by 4.2 inches holds one-half peck or 4 quarts.

Watering.

601. Except when they are heated it is desirable that horses ıld have free access to water at all times. It is always best vater a horse so frequently that he will never be unduly sty. As frequent watering, however, is usually impossible ecomes necessary to water at stated times.

orses should, if possible, be watered before feeding, or not l two hours after feeding. As horses rarely drink in the y morning, the watering must follow the feeding, but after proper interval, if practicable.

. horse requires from 5 to 15 gallons of water daily; depend- upon the temperature and upon the work he is doing. Ex- t in very cold weather horses should be watered at least ee times daily—in the morning, before the noon feeding, and ore the evening feeding. In warm weather, water drawn m a cold well or spring should be allowed to stand long ugh for the chill to pass off before the horse is allowed to nk.

602. A horse should be allowed ample time to drink his fill l not be led away the first time he raises his head from the ter. This must be carefully explained to the untrained man ıo thinks, because a horse puts up his head to get his wind er his first fill, that he has finished. Horses are always led ridden to and from water at a walk.

Stable Duty.

603. Mounted work, except as noted in paragraph **466**, will be llowed immediately by stables; the horses are then thoroughly oomed and the harness and equipment cared for and put vay in good order. The lieutenant in charge of Department B present and in immediate supervision of this work. He is ssisted by the first sergeant.

On Sundays or holidays the horses are thoroughly groomed nce during the day. This is usually done at morning stables. he lieutenant in charge of Department B or some other officer f the battery is present at this time.

On days that the horses are worked morning stables are
before they go out. At that time each chief of section su
intends the removal of manure and foul litter from his s
or picket line, seeing that it is placed in piles convenient
carting away; he causes the drivers and individually mou
men of his section, after cleaning their stalls, to look over
carefully examine their horses to see that they are fit for w
(591), and he causes each horse to be brushed clean of dir
manure. The lieutenant in charge inspects the general co
tion of horses and stables at this time.

On returning from a drill or exercise and after a march
horses are unbridled, their collars and traces removed, and
girths loosened. The men then put on stable clothes, rel
themselves, and prepare for the work of caring for the eq
ment and grooming while the horses' backs are being co
under the pressure of the saddle. After the bits and col
are cleaned the remainder of the harness is removed from
horses and disposed of deliberately, the necessary clean
being done at the same time and in the most convenient man
After the allotted time has been given for the care and disp
of the harness and equipment the horses are groomed
cared for.

The horses are habitually groomed at the picket line.

Under a noncommissioned officer, the horses of the batt
commander's detail, the ninth section, and the supply sect
are groomed by their riders or drivers or detailed privates, t
horses to each man.

Under the chief of section the horses of each other section
groomed by their drivers or riders or detailed cannoneers, t
horses to each man. An absent chief of section is replaced by
caisson corporal.

The horses of officers are groomed by specially detailed m

The men are marched to the horses, take the position of sta
to heel at the direction of the first sergeant, and then begin wo
as soon as the first sergeant commands: **Commence grooming**

604. Grooming is essential to the general health and con
tion of the domesticated horse. Horses improperly groom

ragged manes, unkempt pasterns, feet improperly looked ', form an indication of an inefficient organization. Clean es, properly harnessed and smartly turned out, add to the it of an organization and give a fair indication of its dis- ne and efficiency.

ie principal use of the currycomb is to clean the brush. For purpose a piece of hard wood with channels along its sur- answers equally well.

ie currycomb should never be used on the legs from the s and hocks downward nor about the head, and when occa- ally required to loosen dried mud or matted hair on the ıy parts of the body it must be applied gently.

o groom the horse proceed as follows:

irst clean the front legs, then the hind legs. They will thus e time to dry while the rest of the grooming is being done. t, on the near side, with the currycomb in the right hand, ers over back of comb and the brush in the left hand, begin shing at the upper part of the neck, the mane being thrown he other side out of the way; thence proceed to the chest, ulders, back, belly, flanks, loins, and rump. In using the sh the man should stand well away from the horse, keep his ı stiff, and throw the weight of the body against the brush. e principal work of the brush should follow the direction of hair, but in places difficult to clean it may be necessary to sh against it, finishing by leaving the hair smooth. After ry few strokes clean the brush from dust with the currycomb. laving finished the near side, take the brush in the right ıd, the currycomb in the left, and groom the offside in the ne order.

laving done with the brush, rub or dust off the horse with grooming cloth, wipe about the face, eyes, and nostrils, ange the mane and tail, and clean the dock. Finally go over e legs once more and clean out the hoofs. In cleaning the ne and the tail begin brushing at the end of the hair and adually work up to the roots, separating the locks with the igers so as to get out all scurf and dirt. Tails require fre- ent washing with warm water and soap. The skin under the

flank and between the hind quarters must be soft, clean, a free from dust.

Currycombs, cards, or common combs must never be appl to the mane or tail; the brush, fingers, and cloth are freely u on both.

The wisp is used when the horse comes in wet and also stimulating the coat. It is made by twisting or plaiting st into a rope. The ends are then bent together, cut off squ and rubbed on a board until they form a soft, even straw br The wisp should be worked forward and backward well i the coat, so that full advantage may be obtained from the fr tion. After finishing with the wisp the coat should be laid fl

Hand rubbing is beneficial. When a horse has had very ha exhausting work his legs should be hand rubbed and afterwa bandaged, taking care that the bandages are not tight. exhausted horse should also be given stimulants and wa gruel.

The value of grooming is dependent upon the force w which the brush is used and the thoroughness of the ot work.

Officers and noncommissioned officers should, by continu personal supervision, see that the grooming is properly done.

No horse should be considered in order until he is thorough clean, his mane and tail brushed out and laid flat, his ey and nostrils wiped or washed, and hoofs put in order.

The pasterns and that part of the mane where the crow piece of the bridle rests should be neatly trimmed and the ma and tail plucked.

At each stable the horses' feet and shoes are carefully exa ined. Horses requiring shoeing are reported to the chief section, who notifies the stable sergeant.

The sheath will be kept clean by washing, when necessa with warm water and castile soap.

A horse should never be teased in grooming. It is bad pra tice to attempt to make an animal submit to rough or har grooming. To do so means that he will be provoked into kic ing, striking, or biting, and perhaps confirmed in these b

s. If he objects to the use of the brush or currycomb, the or cloth should be gently used instead. Careful work will lly win the animal into submitting to the proper use of the ning tools.

e object of grooming is not merely to clean the coat. The must be rubbed and massaged to keep the animal healthy in condition. An abundance of friction applied to the skin the horse returns from his work is of special value in ing him healthy and fit.

uick grooming is to be encouraged. Under ordinary condi- a horse should be thoroughly groomed in 20 minutes. On other hand, at least that much time should be devoted to

Each chief of section, after the necessary time has been ted to grooming and after he has made a thorough inspec- of every animal in his section and finds them all satis- orily groomed, reports to the first sergeant and to the officer harge: **First (such) section horses in order.** The officer, r making a general inspection of the whole section and a ical inspection of three or four of the horses selected at lom, may, if the grooming is satisfactory, permit the chief ection to dismiss his men.

65. To confirm recruits in a thorough and systematic method rooming, and to impress upon them the amount of time to be narily devoted to the different parts of the horse, they are uired to groom by detail during their instruction in The lier Mounted.

o groom by detail the instructor causes the men to stand to l and commands: 1. **By detail,** 2. **COMMENCE GROOMING,** an and brush front legs from the knees down, rubbing under fetlocks and around the coronets with the brush and hand; e, 2 minutes. 3. **CHANGE.** Same as at second command, the d legs from the hocks down; time, 2 minutes. 4. **CHANGE,** the near side, with currycomb and brush, groom neck, shoul- , arm, elbow, back, side, flank, loins, croup, and the hind leg the hock; time, 4 minutes. 5. **CHANGE.** First on the near e, after finishing up on the offside, groom chest between the elegs, the belly, and between the hind legs; time, 3 minutes.

6. **CHANGE.** Same as 4, on the offside; time, 4 minut
7. **CHANGE.** Brush head, ears, and throat; with the hand r
the throat and between the forks of the lower jaw; time,
minute. 8. **CHANGE.** Brush and lay forelock and mane; ti
2 minutes. 9. **CHANGE.** Brush out the tail; time, 2 minut
10. **CHANGE.** With the grooming cloth, or with a damp c
or sponge if the parts are foul, wipe out the eyes and nostri
wipe the muzzle, dock, sheath, and up between the hind le
time, 2 minutes. 11. **CHANGE.** Clean out the feet; time
minutes. 12. **CHANGE.** Complete any unfinished work.
CEASE GROOMING. 14. **STAND TO HEEL.**

Total time required for the horse, at least 24 minutes.

To facilitate supervision, the men must be required to cha
promptly at the command.

606. To judge the cleanliness of a horse, the hand may
passed the reverse way of the hair to get a view of the sk
When the points of the fingers are run firmly against the
of the coat, lines of gray are left on the coat of a dirty
and the points of the skin are covered with scurf. Betw
the branches of the under jaw, under the crownpiece of
halter, at the bends of the knees and hocks, under the belly
between the forelegs and thighs are the places usually neglect
when the work is not thorough and which should be looked
when the horse is being inspected.

607. Horses should never be hurried in turning around
their stalls. Should the stalls or driveway be covered with
or be otherwise slippery, sand or litter should be sprinkled
them.

608. Horses are particularly terrified by fire. Should a f
occur in the stables they must be led, backed, or ridden out
the stable. If they are unwilling a coat or gunny sack sho
be thrown over their eyes. Care should be taken that they
not break back into the stables.

609. The lieutenant in charge should make it a point to vi
the stables occasionally at odd times of the day. Horses' hab
and peculiarities may be much better studied when the men a
away than when grooming is going on.

.0. Horses on sick report are under the immediate charge
e stable sergeant.
hen a veterinarian is present, he should prescribe the treat-
to be given sick horses and should inspect all sick horses
ast once daily.
ie veterinarian should also visit all the horses at least once
y, at one of the stated stables; he should be freely con-
d as to minor ailments and as to means whereby the horses
be kept in fit condition.
the absence of a veterinarian the sick horses are treated
ie stable sergeant under the direction of the lieutenant in
ge.

Shoeing.

11. Horses will be shod according to the principles outlined
ie authorized manual.
l officers must understand the principles of proper shoeing
must supervise the work of the horseshoers, being especially
ful to see that the knife is not used improperly.
ie foot should be prepared so that it will approximate as
ly as possible to a state of nature and only such trimming
llowed as is absolutely necessary for the purpose of fitting
securing the shoe.
he knife must never be used on the bars or on the frog.
bars strengthen the hoof and assist in its expansion. Cut-
, therefore, weakens them and prevents them from perform-
their function. The practice of using the knife to trim the
or to cut a notch at the junction of the frog and bar at the
always tends to produce contracted feet.
ever use the knife on flat feet or on the hoof of a horse
has been running barefoot.
agged parts of the frog may be cut away by careful use of
nippers.
/ith a flat foot it is frequently necessary to remove a part of
outer edge of the wall in order that the nails may be driven
the white line where they belong. This is the only case
ere it is permitted to rasp the outside wall. The outer coat-

ing of the wall and the layers of dead horn on the sole and fr serve to retain the moisture in the hoof.

The hot shoe must never be applied to the horse's foot un any circumstances.

When shoes are left on the feet too long, corns and other a ments are the result. Ordinarily a shoe should be replaced least once a month. The lightest shoe that will last for t time is the best shoe. It should carefully follow the form of foot, or if the foot is broken the shoe follows the original fo of the foot. Its length is regulated by the bulb of the frog.

The ground surface of the shoe should be level and smoo except for use in snow, when the ground surface should concaved to prevent balling. That portion of the upper surf which presses against the bearing surface of the foot must level, smooth, and accurately shaped to support it, and when upper shoe surface is wider than the bearing surface the in edge must be concaved to avoid excessive sole pressure. T is one of the most important requisites of correct horseshoei Concussion of the sole against the inner edge of the upper s surface invariably produces soreness.

612. One side of the shank of a horse nail is flat. The ot side is concave and also has a bevel near the point. This be as it enters into the horn forces the point of the nail in t direction of the other, the flat, side. Therefore in driving a n always hold it with the flat side toward the outside edge of shoe.

Nails should come out at a height of not more than 1 in from the bottom of the hoof.

613. In garrison, at the discretion of the colonel or of t commanding officer, the horses may be left unshod, but sh will be kept ready for each horse.

Inspection of Shoeing.

The following examination should be made while the ho is standing on a level floor with the foot on the ground:

(*a*) Are the axes correct when viewed from the front a from the side?

) Does the shoe follow the outer line of the wall to the last hole and from there extend outward, allowing about one-th of an inch at the heel for expansion? Has the rule inst rasping the hoof to fit the shoe been violated?

) Is the toe clip in the center properly made and properly ed?

) Are the nails driven at the proper height and proper dis-e apart? Have any old stubs been left in the wall?

) Are the clinches well turned and set in, of the proper , and have they been smoothed off but not rasped sufficiently veaken them?

he foot should be raised and the examination continued.

f) Is the shoe of the proper size and weight; the last nail back of the bend of the quarter?

g) Has enough horn been removed? Has too much been oved? Is the foot level?

h) Does the shoe rest evenly on the wall, covering the but-ses, and showing no air space at any point?

i) Is the shoe properly concaved so as to avoid pressure on sole?

j) Has the knife been used on the bars, sole, or frog?

k) Are the nails well seated and of the proper size?

l) Are the heels of the shoe correct in width and thickness l are they properly rounded without sharp edges or points? their length even with the bulb of the frog?

SECTION III.—CONDITION AND EXERCISE.

114. Condition means thorough bodily and muscular fitness the work required. Although thorough fitness is essential, standard to be aimed at is not that of the race horse, whose ndition is at the maximum, representing, as it does, a maxi-m of food, a maximum of work, and a concentrated nervous ergy which can not be indefinitely maintained at highest ch. The quality of condition required for the artillery horse shown in a horse well covered with flesh, well hardened on, thout sign of running up light toward the flank, full of

spirits, capable of long-continued exertion without fatigue, a with a good digestion waiting on a healthy appetite. Such state of bodily health can be almost indefinitely continued wh once attained and allows some reserve of flesh and ani spirits to draw on when hardship comes.

Condition of this description must not be confounded with f ness. The fresh young horse from the dealer is fat, not f his muscles are soft and flabby, unable to stand severe exert and rapidly fatigued. Although he is full of life at the beg ning of the day, a very moderate amount of work will tire hi

615. The condition of the full-fed, hard-worked horse is s to be **hard**; that of the horse underfed and overworked, po that of the fat horse doing no work, **soft**.

616. Every injury to the back, shoulders, or other parts the body due to harness or saddlery is brought about by fri tion or by pressure or by a combination of the two. Fricti rubs and so wears the part away; pressure partly or entir cuts off the blood supply and so strangles the tissues.

A horse in hard condition has greater resistance to fricti and pressure than one in soft condition. The evil of soft c dition or poor condition is more readily shown by friction th by pressure. The horse in poor condition loses vitality a resisting power through hard work and insufficient food; the in soft condition has great vitality, but it quickly evapora and he has practically no resisting power at all.

In every function of a horse the question of condition prese itself. It influences lameness and sore backs, it is the ba of staying power and resistance to disease.

617. The only way to get animals into condition is by t combination of sufficient good food and sufficient healthy ex cise, continued over a long period.

The transformation of fat, flabby flesh into **hard**, to muscle is a gradual process that can not be forced; a regu course of graduated exercise is the only way to accomplish This work should never be so severe as to fatigue the anim the soft muscles will suffer to such an extent from the reacti of overexertion that an actual loss of flesh will result. Wo

tired animals when unfit is a fruitful cause of accident and ase. But once good, hard, muscular development has been ined, any work within reason will not only be performed iout great effort but will continue to add to the quality of condition already acquired. It is important to recognize cumulative power of condition. It means that a good unt of work may be demanded from a seasoned horse, that ctually does him good, and that, while performing it, he will less and less risk of accident and disease. Thrown entirely of work for a considerable period, however, the conditioning ess will have to be repeated, though not, perhaps, to the e extent. This must be particularly borne in mind when nals are taken into work after a run at grass or a long od of sickness.

18. At first the work should be light but, if possible, spread r a considerable time. A minimum of two hours daily, exding Sundays, should be required. Much time should be nt in the open air daily, pure atmosphere having a good ct on the health and spirits.

19. The bulk of the work in conditioning a horse should be ried out at a slow pace. The conditioning exercise for the e horse may be considered ideal. To fit such an animal for faster part of his preparation he is kept constantly on the ve for 2 or 2½ hours in the morning; 2 or 3 miles being the trot and canter, and for 1 or 1½ hours in the evening the walk. Even when his faster work is in progress long lking is continued. Plenty of walking then, and a moderate ount of trotting should constitute the exercise for putting artillery horse in working condition and for maintaining In the early part of the work the trot period should be about 5 minutes' duration; this is gradually increased until, thin 4 or 6 weeks, trot periods are of 20 minutes, which ould rarely be exceeded. During any daily period the ratio walk to trot should be about 4 or 3 to 1. The first mile ould always be covered slowly, so that the horses can feel eir feet, stretch their legs, and empty their bowels before ey are called upon to trot. The last mile should also be

walked so that they return to the stables cool. To crowd m work into short time under the impression that it will add condition can not be too strongly condemned; it does not har muscle on the animal, but tends to reduce his flesh, to irrit his temper, and to render him liable to chill on return fr work.

The latter part of the elementary training period should f the horses of a battery in thoroughly fit condition. During drill period, while the cannoneers are getting their specialis training in the gun squads, the lieutenant in charge of Dep ment B trains the drivers and conditions the horses. In emp ing the conditioning trots, it is desirable to put the drivers a large circle with pairs unhitched and traces unhooked. officer can then most favorably watch the riding of the and the working of the horses. During the later drills by tery, the horses should not be permitted to stand idle when guns are unlimbered, but should be worked at the walk or t sufficiently to maintain or to add to the condition of the mals. The horses should be in their hardest condition w training in marching begins.

620. To produce the best results, the policy of full feed and fair work must be adopted. No other combination will the best out of the animal. A small ration and little work keep him normal in appearance but plenty of food and s cient work judiciously combined make the only routine wh will really fit either the draft or riding horse for use in w The correct adjustment of ration to work is a matter of pr tical knowledge which a book can not teach; it must be gai by observation and experience. When the work is light, as the beginning of a young horse's training, half a grain ra is generally accepted as a standard on which to begin feedi but a rule of thumb method should be avoided and each hor needs considered; in no case should the ration be so small the work so hard that a round and glossy sleekness disappe

621. Thirst and sweating are very prominent features of early stages of conditioning and are to some extent depend on each other. Apart from the sweating which may natura

xpected as the result of work, some young horses sweat very
usely from purely nervous causes, more especially when the
s conducted in a confined atmosphere.

is not always possible to prevent every young horse sweat-
from the excitement of new lessons, particularly in the case
ighly bred or excitable animals; but such outbreaks exhaust
orse more than a far greater amount of quiet work and
ld be avoided in every way.

orking in the open air in preference to a roofed school,
lute quietness of methods, the avoidance of long monoto-
s lessons, and the example of older, well-behaved animals
tly doing the same things are all valuable in keeping horses
in body and temper; but there are instances where sweat-
can not be prevented, and thirst is a natural result. Thirsty
es are to be allowed to drink their fill; it is best that they
ld not be sweating, but the fact of their being hot need
be a bar to their drinking if care is taken to keep them on
move until cool and so prevent risk of chills. As their
lition improves the keenness of their thirst will diminish.

he quantity and quality of the sweat are very generally and
ectly taken as an index of condition. When the body is
and flabby, slight exertion produces copious sweat of a
py, lathery nature which dries slowly and frequently breaks
again. As the condition improves the amount of work
uired to make the skin damp increases and the sweat itself
ess greasy and more watery in consistence, while it dries
h rapidity and does not recur. There are, however, some
-sweating horses that lather freely even when in good con-
on. Weather has a great influence on the amount animals
spire, for whereas on a cold clear day it takes a lot of ex-
on to turn a hair, a damp, muggy morning will make them
at freely.

22. On a march in hot weather a clinical thermometer is
en of the greatest service, since the horse's temperature is the
est index of his fitness to continue work. The temperature
a horse under normal conditions is from 97.5 to 101.3° F.
rises with exertion. If this rise is small there is no danger,

but if it reaches 103 to 104 precautions must be taken. If th
be a further rise to 105, work must be given up entirely.

SECTION IV.—CARE OF HORSES ON THE MARCH AND IN THE FI

623. Unless the horses are in condition it is impossible
them to undergo the fatigue and exertion incident to any
longed effort. It is therefore assumed that in peace the ho
of a battery have been conditioned before they are called u
to make a march of any importance. In war soft remounts
be furnished perhaps almost continuously. Every effort m
then be made to work and condition these horses during
course of active operations, or the mobility of the battery
be vitally impaired and the wastage of horse flesh unnecessa
increased. If under pressure of circumstances the working
unconditioned animals is necessary, the distances to be cov
and the time occupied must be comparatively short, un
military necessities override all thought of loss or injury.
its effect upon the animal the length of a march is to be
sidered not only in miles, but also with regard to the nu
of hours the horse is under saddle or in harness. The la
consideration is frequently the more important. The adv
of a column in service may be at the rate of 1 mile in fou
five hours. Under such circumstances a 5-mile march may
for the exhibition of extreme endurance.

Experience tends to prove that six hours' reasonable wo
day is good for a conditioned horse. Assuming favorable
ditions, such as good roads, weather, proper feeding, etc.,
ducting 10 minutes for rest each hour, and at the trot and w
in the ratio of 1 to 3, a battery should be able to ma
about 25 miles daily with one day's rest in seven. It must
appreciated that unfavorable conditions, however, reduce
distance to an average of from 15 to 20 miles.

624. The horses should be carefully inspected before start
to see that they are fit for work. Special effort must be m
to spare those not fit. Oftentimes it will be possible to vary
load in such a way as to spare a team. Thus, when the cais

empty it may be advantageous to transfer one of the caisson s to the piece.

25. The hour of start depends upon circumstances. As a it will be made about 1 hour after broad daylight. Both and animals rest well in the early morning hours. In dark, feeding arrangements are not satisfactory and sad- y and harness may not be properly adjusted. Night marches slower and more fatiguing than those in day.

26. Keeping in mind the fatigue caused by the weight car- , irrespective of the distance traveled, the maintenance of ood average pace throughout the entire march is to be red.

rovided it is not unduly hurried at any point, the quicker march is completed the less fatiguing it is to both horse rider. Under favorable conditions field artillery should be to maintain a rate of 4 miles per hour, horse artillery 5 s, over ordinary distances. For an occasional forced march, e rates may be slightly increased without danger of injury he animals.

27. It is always a great advantage to vary the gait. No should be maintained so long without a break as to weary or horses. Trot periods should never exceed 20 minutes. quently during walk periods where the roads are good, the ers and individually mounted men are required to dismount walk. This rests the horses by relieving them of the ght, and it also rests the men and relieves the strain on m by bringing into play muscles other than those exerted iding. This is the best cure for lounging in the saddle. A n always rides better and with less effort to his horse if he rested himself by walking for a time.

28. The first halt is made after marching about three- rters of an hour and is about 15 minutes long to enable ness and saddles to be adjusted, men to attend to the calls nature, horses to stale, etc. Judgment should be exercised in ecting the place for the first halt; it should not be made in a lage or a place where the objects of the halt would be de- ted.

629. As a rule after the first halt, one of 10 minutes is m each hour; that is, the battery marches for 50 minutes then halts for 10. In very hot weather the halts must longer and more frequent. Halts must also be frequent wh the roads are hilly or difficult (458).

630. Horses on the march can not be held to their f capacity for work unless they are amply fed. Feeding on march in peace and war are very different matters. In pe there is usually no sufficient reason why regularity of feed should be interrupted. In war feeding a little at every opp tunity should, if necessary, be practiced; thus at no time is horse's stomach overloaded and at no time is it entirely emp

On marches in time of peace, and when not prevented other necessity in time of war, there should be regularity feeding. When men and animals are held to a march l after their mid-day meal, they become peevish and irritab some men are likely to abuse their horses or to punish th on the slightest provocation, while the animals fret and wo and needlessly waste their energy. It is while in this st of mind or condition of body that sores and injuries are m liable to be caused. Moreover, when camp is reached ev one is tired and out of sorts, the animals are not properly ca for and their proper feeding may be neglected. It is alw better to carry food for the men and grain for the animals t to halt promptly at the regular feeding time even though camp selected may be near. Camp is then better made and horses receive more careful attention.

With full allowance of grain and hay on a march, an effect and convenient plan of feeding is as follows:

At reveille, one-third the grain allowance; at mid-day, o third the grain allowance; at stables, after watering, one-h the hay allowance; just after the grooming is finished ab 5 p. m., one-third the grain allowance; at 11 p. m., one-half hay allowance to be fed out by the picket-line guard. T serves to keep the horses quiet during the night. When horses are on the picket line, one man from each section m constantly watch the horses of the section to make sure th

l bags are not tossed off or torn and that each animal gets grain. At feeding on the march, each man carefully watches own horses.

31. The horses should usually be watered on the march never opportunity offers. If the weather is cool it is usually ecessary to water before an early start as most of the ses will then refuse water. The principle of watering be- feeding and not until 2 hours after feeding should be ered to, if possible. In hot weather horses will drink lously 2 or 3 hours after the evening feed of grain. Water- at this time does them great good. Thus, if the horses are at 5.30 p. m. it is of great advantage to water them be- en 8 and 9 p. m. This can usually be done without seriously urbing the men or interfering with their rest.

f a mounted command has to march a long distance without ter, so that it will be necessary to camp enroute, the ani- ls are fed but denied water until just before starting, when y are permitted to drink freely. The command marches the afternoon and does not encamp until it has accomplished least half of the distance; it moves early in the morning reach water.

Horses must be watered quietly and without confusion; the nner in which this duty is performed is a good test of the cipline of a mounted command.

The horses are led or ridden at a walk to and from the tering place. Crowding will not be permitted, nor will any rse be hurried or have his head jerked up from the water.

The horses are watered under the immediate direction of the ior officer or noncommissioned officer present. An officer uld always be present when the horses of other commands e likely to be met at the watering places.

32. At all halts on a march, chiefs of platoon and section ll personally see that the drivers attend to their horses as escribed in paragraph **482**. Any injuries caused by harness d saddlery must be discovered and reported at once.

At the first stables after camp is reached, not only are the en required to report any injuries discovered on their h-----

but the lieutenant in charge of the horses must personally inspect the back and shoulders of every animal. Where injuries, no matter how slight, have occurred, the officer will direct and supervise a readjustment of the harness or saddle. It must be thoroughly appreciated that each injury is due to a certain definite cause, which must be removed to produce a further effect. Practically no case will arise in which a little skill or ingenuity in readjusting parts of saddle or harness will fail to relieve the injured part. The man's bed blanket under his saddle, a shortened or narrower collar, or a lengthened or broadened one, will relieve injuries which, if neglected, might soon put the animal out of work.

Handrubbing is the best preventive of sore shoulders and backs. It massages the tissues and stimulates the circulation. It must be employed freely at halts and at stables after the march.

It is only by constant attention to these details on the part of officers and men that a battery can be kept fit to march day after day and be ready to meet any reasonable demands which the emergencies of active service may impose.

633. In temporary camps the animals are tied to picket lines stretched between the carriages. They are tied on the line so that the horses in each section stand together. Precautions should be taken to tie animals of mean disposition where they can not injure their neighbors by kicking or biting. In cold, wet, or windy weather, horses like to stand with their tails to the wind, and effort should be made to place the lines so that this will be possible. In hot weather endeavor should be made to get as much shade as possible; if the camp be permanent, shade for the lines must be extemporized. Continued standing in the hot sun will seriously debilitate the animals.

The sanitation of the picket lines in a permanent or semi-permanent camp demands constant attention. Ditches should be cut to allow them to drain easily and manure and foul litter must be removed daily. During the fly season the lines should once a week be sprinkled with crude oil or other inflammable material and burned off.

! the ground becomes sodden with rain or otherwise broken the position of the lines should be changed.

! there be an extreme range of daily temperature, horse ers are of value. The use of covers, however, is liable to se. A horse can stand great cold when properly acclimated. over saves feed, but its use makes the animal dependent n it and renders him much more liable to colds and chills n if his coat had been entirely relied upon to afford him per protection. Cold rains will tell on the condition of un-ered horses unless they get extra food.

HAPTER III.—TRAINING OF ARTILLERY HORSES.

Section I.—Object and Sequence of Instruction.

34. The artillery horse is a combination saddle and draft mal. When received in the battery he has usually been den and broken to harness. Additional training is, however, essary to fit him for his work in the artillery, since he must velop into a fairly good saddle horse and at the same time st learn draft in the artillery harness.

35. His training, therefore, is of two distinct kinds:

1. Training for saddle.
2. Training for draft.

The horse should be trained for saddle before his draft train-g begins.

Section II.—Training Remounts.

36. The time required to train thoroughly a remount for the tillery service depends upon so many conditions, such as the imal's age, condition, temperament, capacity and conforma-on, and the skill, zeal, industry, and ability of instructors and ders, that it can only be stated approximately. With young d undeveloped horses two years can be profitably employed. ecourse should then be had to a more extended system of aining than can well be embodied in these regulations, and ee use should be made of the knowledge and skill of the

graduates of the Mounted Service School. But in emergenc mature horses of good conformation and in excellent conditi can be molded, in about three months' time, under compet instructors and riders into animals fulfilling fairly well t requirements of the artillery service. To meet such emergenc the following procedure is given.

When received in the regiment the remounts are placed un the care of the senior veterinarian and isolated for the minim time necessary. They are then distributed to the batteries.

During the period of training the remount should always ridden by the same rider. Training takes precedence over other work except the instruction of recruits. The rid should be chosen for their love of horses and their patience a gentleness. All concerned in the training should be well i structed and skillful riders or there is no hope of success.

The various means of training are left to the initiative of t instructor, but they should all be based upon two fundamen principles, the winning of the horse's confidence and a metho ical progression on the part of the rider, founded upon t association of sensations. He should never lose sight of t benefit to be derived from a training that progresses method ally and without haste.

The best test of the instructor's ability is the condition of t horses, the cleanness of their limbs, and their temper at the e of their training.

The instructor should constantly bear in mind these precep

Never begin work without being absolutely sure what is to done.

Proceed in the horse's education from the known to the u known; from the simple to the difficult.

Always use exactly the same effects to obtain the sa results.

Remember that in the execution of every movement positi should precede action.

Never ask anything of a horse while he is still under t impression of a preceding movement.

Never combat two resistances at the same time.

rT VI.—Care and Maintenance of Equipment.

CHAPTER I.—GENERAL PROVISIONS.

. The commanding officer of an organization is responsible he equipment issued to him is kept complete and in good eable condition, and that his officers and men are properly cted in the use of the tools and supplies issued for the nd preservation of public property.

. The organization commander will require that as soon sible after being used all articles of equipment shall be ned and, if necessary, repaired; and that the articles when all be in readiness for immediate use.

\PTER II.—CARE OF THE BATTERY EQUIPMENT.

Section I.—Responsibility.

The **captain** is responsible for the care and maintenance battery equipment. He will constantly supervise the f lieutenants and other subordinates charged with respon- for the condition of parts of this equipment.

lieutenant assigned to Department A (32) has direct of and is responsible to the captain for the good order ficiency of all parts of the wheeled matériel; the one d to Department B, of the horses, harness, and horse ent; the one assigned to Department C, of the personal ent.

supply sergeant is responsible to the captain for the l care and maintenance of the Government property to the battery.

chief mechanic is responsible to the lieutenant in charge good order and repair of the matériel in actual use by

The Longe.

639. All horses should be well trained in work on the lo
The first lessons are so important that they should be gi
by the instructor himself, or by a noncommissioned officer
experience and proved skill. If well given, only a few les
of short duration will be necessary.

The cavesson should be wide enough and well padded.
should be adjusted so that in work on the circle the eye on
side away from the trainer can not be injured; placed h
enough not to hinder breathing; and, in order that its act
on the horse's nose may not be violent, it should not have
much play.

The driving whip is held in the right hand when the ho
works to the left and vice versa, the butt coming out on
side of the thumb. It is kept out of sight as much as possi
and only used to threaten or for light touches. It should ne
have a lash on the end.

The instructor holds the longe in his right hand about
inches from the horse's head; the other end, not coiled,
folded in convenient lengths, is held in the left hand. Af
patting the horse the instructor moves forward, pulling ligh
on the longe, clucking at the same time to the horse; in t
manner he moves with the horse around the riding hall
inclosure on straight lines and gradually sharpened curves.
stops frequently, saying whoa, pats the horse, and then pas
to the right side, changes the longe in his hands and commen
the same work with the right hand. When the horse mo
forward at the cluck, stops at command, and moves willin
and without pulling, the instructor stops moving on strai
lines, lets the longe slide a little, and puts the horse on a sm
circle of about two yards radius; he himself moves on a c
centric circle, a little in rear of the horse's shoulders, so as
keep him moving. He often stops the horse, goes to him a
pats him, and then moves him forward again.

The horse is worked on the circle to the other hand in t
same manner. If he hesitates to move forward, the instruct

f five strips of canvas of the same size. When used as a cushion it will be folded as follows: Spread the paulin on round and throw the ropes upon it; fold each outside strip the strip adjacent to it and continue to fold in this manuntil the paulin is the size of a single strip; double it in ame direction; then fold both ends over, one falling above ther so that the folded paulin is one third the length of a ; place on the chest with the exposed end down.

e metal ends of **picket ropes** will be kept free from rust, the hooks sufficiently open to be readily engaged in the

l kits will be kept complete and serviceable; edges of cold ls free from nicks; drifts and punches properly shaped iles clean.

per wire is used to lash nuts and other threaded parts not ed by split pins to prevent unscrewing.

cial **wrenches, spanners** and other tools and accessories e used only for the purposes for which intended.

s are used only when in the field. The blades will be right, sharp and well oiled; the scabbards clean.

ruction will be given in different methods of using the **blocks** and **rope**, and in making the common **knots** and s.

riages in use will be equipped habitually with all articles ir prescribed equipment. The battery wagon and store are habitually kept packed. When convenient, however, rious chests contained therein may be kept outside the s for convenience in getting at their contents.

Materials for Cleaning and Preservation.

The proper uses of the supplies furnished for the clean- preservation of the battery equipment are set forth in in the Handbook of the matériel and in Ordnance Pam- o. 1965.

neral these materials are issued for the following pur-

come toward or go away from the center according to the fi dom given; in a word, be on the hand with the slightly stret longe, as later he should be with a light tension on the reins.

Saddling.

640. When the horse is quieted by work and perfectly ge on the cavesson, advantage is taken of that to teach him gr ally to bear the girth, a lesson which, if given in the st might prove difficult. The saddle is first put on without s rups or stirrup straps; the girth, quite loose at first, is tighte gradually during the work. When the horse is accustomed the contact of saddle and girth, the stirrups are added allowed to hang down on each side at the walk and trot preparation for the first mounting lession. Saddling and mo ing a young horse for the first time on the same day gener arouses his resistance.

Mounting.

641. The instructor selects, according to circumstances, most opportune moment for giving the mounting lesson, alw taking advantage of the calmness from fatigue at the end the period of instruction.

This lesson may also be given during the work on the lo but always after the horse has been quieted by exercise. instructor personally directs the first lesson, which is given each horse individually. The greatest gentleness and patie are here necessary.

Accompanied by an assistant, carrying a measure of oats need be, he places himself squarely in front of the horse pats him, taking hold of him only in case of necessity; the ri approaches the horse's head, pats him on the forehead, over eyes, on the neck and haunches. He strikes the saddle, low and raises the stirrups, then takes the reins, leaving them w long. He mounts without hurry, but without hesitation. during the lesson the horse moves out of place or backs aw the rider goes back to the head, draws the horse forward w the snaffle reins, and quietly begins again.

aw linseed oil as an ingredient for making the paint more able for outside work.
urpentine for thinning paint.
ash and varnish brushes for painting.
iscellaneous Materials.—Borax as a flux in welding;
amel's hair brushes for removing dust and lint from optical ruments;
astile soap for cleaning leather;
hamois skin as a wiping cloth for instruments except on the es;
rocus cloth for polishing metal;
mery cloth for cleaning metal by abrasion or wearing away he surface;
. and H. or Paco soap for cleaning cloth and web equip- t;
avaline for polishing metal, such as bearing surfaces of irs, etc.;
usset leather dressing for polishing leather after cleaning;
iddle soap as a dressing for leather;
ap polish as a substitute for lavaline;
onges: Large size for washing carriages, small size for ning leather;
aste as a wiper for general cleaning;
ax for rubbing on thread before sewing.

Cleaning of Carriages, Etc.

1. Frequent wiping or washing of all parts of the carriages sirable not only for the purpose of keeping them clean, but to aid in the detection of missing bolts, nuts, and split pins of parts broken, cracked, or out of adjustment.
ckets and sponges are habitually used for washing car- es. The use of a hose through which water is thrown bly against the carriage tends to wet parts which are not y accessible for drying. When convenient, carriages may auled into shallow water for washing.
ter washing, the carriages are dried with sponges or cloths.

The Aids.

643. Preliminary education in the aids is quite necessary permit the horse to be handled out of doors. It consists teaching him to move forward at the call of the legs, to slow and stop at the pressure of the legs and tension on the re and to turn under their action. The basis of all training freedom in the forward movement. From the first the h must be taught to respond to the legs.

Bending Exercises.

644. To place the horse's head in position (to arch his correctly), the trainer, standing near the horse's right shoul takes the right rein in the left hand and the left rein in right hand, the hands about four inches from the snaffle, p with the bit and gently draws in the reins toward the wit as the horse drops his nose. When the horse relaxes the lo jaw by opening the mouth and carries in his head so that face is nearly perpendicular to the ground and the muzzle l with the upper part of the shoulder, the trainer relaxes reins and makes much of him.

To bend the neck to the right: The horse's head being position, the trainer, dismounted, gently drawing in on right rein, carries the horse's head a little to the right, the hand supporting the effects of the right. The horse's h should be kept at a constant height. The trainer should contented with a little progress at each lesson. Gradually with the greatest patience and gentleness the horse is brou to carry his head around 90°, the face still remaining ne perpendicular to the ground and the muzzle at the height of upper part of the shoulder. The neck should not only be fle (arched) at the poll but also bent to the right at the same pl

The horse's head should invariably be brought back into p tion, the movement being made smoothly and without haste, hands regulating. The horse is then caressed.

These supplings are repeated mounted as soon as the ho understands what is wanted.

men are practiced in lubricating the various mechanisms arts, and are thus taught the location of the oil holes and points where oil should be applied, and the proper methods ndling the oiler and waste.

ailed instructions with reference to the uses of the vari- ils are contained in the Handbook.

Disassembling and Assembling.

. In disassembling, if the parts can not be readily re- l, the tendency of uninstructed men is immediately to use reat force. By teaching them to exercise patience and in- ty, this tendency will be checked and the frequent break- f parts avoided. Metal parts should never be struck di- with a hammer; a buffer of wood or soft metal should s be interposed. The disassembled parts should be kept ier while being cleaned and should be reassembled as spon ssible.

assembling, a thin coating of oil is applied to all unpainted parts, including especially the threads of bolts and nuts, ler to prevent the formation of rust and to aid in the next sembling. At points where friction may be developed when atériel is in use, a lubricating oil is used; at other points slushing oil. All nuts are secured by split pins, which d be replaced and properly opened after the nuts are ed home; threaded parts not secured by split pins are d with copper wire to prevent unscrewing.

fore assembling it is advisable to paint those parts requir- t that after assembling become more or less inaccessible. doing, however, care must be taken to see that no bearing ces are painted.

Repairs and Adjustments.

. All cannoneers are taught to effect minor repairs such e replacing of a worn-out brake shoe or of a damaged pole to make simple adjustments such as the adjustment of the es.

either case a wheel harness should be used, as this accustom
him to the breeching.

When the harnessed horse is not attached to a carriage duri
training he should not be worked at a trot for such a leng
of time that the collar will bruise his shoulders or make hi
sore.

Before being placed in a team, the horse should have becom
accustomed to the pressure of the collar against his shoulde
by means of ropes improvised as traces, and held by an assista
walking behind him. The assistant causes the pressure to
increased very gradually, being careful not to excite resistan
by the horse.

When first hitched to a carriage the young horse should
placed in the off wheel. If placed in the swing, he is able
shirk and may be confirmed in that bad habit. Any sudden
violent action on the part of the driver that would cause t
horse to jump against his collar must be carefully avoided,
the horse will bruise his shoulders and always fear the colla

651. When the horse has become accustomed to his s
roundings and manifests a willingness to pull his share of t
load as off-wheel horse, he should then be used as off-lead a
off-swing horse, and his training completed by working him
all positions on the near side. In all such training a caiss
without ammunition should be used, and on level ground on

652. When the horse works freely in any position in t
team with an empty caisson on level ground, the difficulty
draft should be gradually increased by use of the brake. Th
training should be followed by work over more difficult grou
and with loaded carriages (**450–463**).

Particular attention should be devoted to training the hor
to climb steep hills; but care must be taken to avoid givi
him tasks beyond his strength. This is especially the case wit
a spirited horse, which may easily, through errors of judgme
on the part of the driver, be made into a balker. The mo
difficult haul is up a steep side hill, where the carriage slew

All difficult tasks will be approached quietly, the driver avoi
ing any unnecessary noise or excitement.

RT VI.—CARE AND MAINTENANCE OF EQUIPMENT.

CHAPTER I.—GENERAL PROVISIONS.

. The commanding officer of an organization is responsible he equipment issued to him is kept complete and in good eable condition, and that his officers and men are properly cted in the use of the tools and supplies issued for the ind preservation of public property.

. The organization commander will require that as soon ssible after being used all articles of equipment shall be ned and, if necessary, repaired; and that the articles when iall be in readiness for immediate use.

APTER II.—CARE OF THE BATTERY EQUIPMENT.

SECTION I.—RESPONSIBILITY.

. The captain is responsible for the care and maintenance e battery equipment. He will constantly supervise the of lieutenants and other subordinates charged with respon- y for the condition of parts of this equipment.

lieutenant assigned to Department A (32) has direct e of and is responsible to the captain for the good order fficiency of all parts of the wheeled matériel; the one ed to Department B, of the horses, harness, and horse nent; the one assigned to Department C, of the personal nent.

supply sergeant is responsible to the captain for the il care and maintenance of the Government property l to the battery.

chief mechanic is responsible to the lieutenant in charge e good order and repair of the matériel in actual use by

the battery; for this purpose he has general supervision of battery mechanics, except those assigned to horseshoeing, during cleaning periods, of all corporals and privates engaged in work in the matériel.

The **chiefs of section** are responsible to the lieutenant in charge for the good order of all matériel and equipment issued to their sections. They are directly responsible for the serviceable condition of their teams, harness, and horse equipment.

The **gunners** are responsible to their chiefs of section for the good order of their pieces and caissons. They are directly responsible for the good order of the pieces.

The **Nos. 4** are directly responsible to their gunners in gun sections, to their chiefs of section or the caisson corporal in charge of caissons in caisson sections, for the good order of their caissons.

The **drivers** are directly responsible to their chiefs of section for the good order of their horses, harness, and horse equipment.

The **instrument sergeant** is responsible to the captain for the good order of the range-finding, fire-control, and signal equipment.

The **telephone corporal** is responsible to the instrument sergeant for the good order of all the signal equipment of the battery.

Members of the **special details** are responsible to the telephone corporal for the good order of articles of signal equipment, to the instrument sergeant for the good order of other articles of the range-finding and fire-control equipment issued to them.

Individuals are directly responsible for the good order of articles of personal equipment issued to them. Men assigned to sections are responsible to their chiefs of section for the good order of such articles.

It is the duty of all men to report at once to the noncommissioned officer, or officer to whom they are responsible, any injury to the matériel or any deficiency in the equipment.

SECTION II.—INSTRUCTION.

56. Field artillery matériel requires intelligent, systematic, constant care.

orrect instruction and frequent practice in this subject fit personnel to keep the matériel in serviceable condition and ffect repairs promptly and satisfactorily.

atériel, all parts of which are clean, correctly surfaced, and ood repair, functions properly with the least possible wear permits the making of repairs without unnecessary delays. etailed descriptions of the matériel in use, with full in- ctions for disassembling, assembling, cleaning, and caring the same, are found in the Handbook of that matériel issued he Ordnance Department. The noncommissioned officers of higher grades and all officers should be thoroughly familiar ı the contents of the Handbook.

57. Instructions in the care of matériel is practical. It is ied on under the direct supervision of an officer in the park ng the regular cleaning periods or at other times.

he instruction of cannoneers includes the following:

Nomenclature of the principal parts of the piece and son;

Uses and care of tools and accessories;

Uses of the different materials issued for cleaning and ervation;

Cleaning of carriages, of leather cases and straps, and of vas covers;

Principles of lubrication, and the lubricating of all parts uiring it;

Disassembling and assembling those parts of the matériel ch periodically require cleaning and repair;

Making of minor repairs and adjustments;

Special cleaning required after firing;

Painting of carriages.

he instruction of drivers and individually mounted men in- les the care of harness and horse equipment.

The instruction of members of the battery commander's d tail includes the care of the range-finding and fire-control a signal equipment.

Nomenclature.

658. The study of nomenclature may well be continued to i clude practically all parts of the piece and caisson if ti permits.

The purpose of this instruction is not so much to memor the exact names of the many parts as to call attention to th existence and to their relations with other parts; facts wh otherwise easily escape notice. The knowledge gained stim lates interest and develops resourcefulness in making repairs.

Tools and Accessories.

659. As it can not be safely assumed that, without instru tion, even the simplest tools will be used correctly by men n accustomed to working with them, it is necessary that instru tion and practice be given in the uses and care of all tools a accessories with which the men may be called upon to work.

The **axes, hatchets, picks, and shovels** carried on the carriag are intended for use with the battery when in the field when engaged in exercises simulating field service and will n be put to other uses. The working edges and surfaces will b kept bright and lightly oiled, the edges sharp if intended fo cutting or smooth if for digging, and the handles painted.

Canvas buckets are used for watering animals and for was ing carriages and equipment. If possible, they should be dri before placing them in the holders. To fold the bucket: Plac the bottom of the bucket on the ground and hold the bottom i position with both feet; grasp the top with both hands and tur it either to the right or left so that the sides twist and fold.

The **laterns** carried on the carriages are used for illuminatio only when in the field. They will be kept clean, filled, and read for use.

In the park, **paulins** are used to cover harness and guns; o the march as seat cushions. The paulin is square and is mad

five strips of canvas of the same size. When used as a cushion it will be folded as follows: Spread the paulin on round and throw the ropes upon it; fold each outside strip the strip adjacent to it and continue to fold in this manntil the paulin is the size of a single strip; double it in ame direction; then fold both ends over, one falling above ther so that the folded paulin is one third the length of a ; place on the chest with the exposed end down.

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rriages in use will be equipped habitually with all articles eir prescribed equipment. The battery wagon and store n are habitually kept packed. When convenient, however, arious chests contained therein may be kept outside the ns for convenience in getting at their contents.

Materials for Cleaning and Preservation.

). The proper uses of the supplies furnished for the cleannd preservation of the battery equipment are set forth in l in the Handbook of the matériel and in Ordnance Pam- No. 1965.

general these materials are issued for the following pur-

Oils and Greases.—Lubricating oil, sperm oil, clock oil, petroleum or vaseline, for lubrication;

Light slushing oil and cosmic as rust preventives;

Coal or kerosene oil for the cleaning of metal parts and lanterns;

Boiled linseed oil, raw linseed oil, and turpentine as ingredients of prepared paint;

Neat's-foot oil for softening and preserving leather;

Hydroline oil for filling recoil cylinders. This oil should used for no other purpose.

Officers and men should be able to distinguish the diffe oils and greases by the color, smell, or viscosity.

The oil cans issued to a battery, their capacities, disposi and contents are as follows:

	Coal oil.	Hydro-line oil.	Lu in
	Gallons.	*Gallons.*	*Ga*
Three 5-gallon oil cans on battery wagon	5	5	
Three 5-gallon oil cans on store wagon	5	5	
Two tubular two-thirds gallon oil cans on forge limber	⅔	.....	
Two tubular oil cans on store limber	⅔	.....	
Forty-eight tubular oil cans, 3 in each limber, 1 of each kind of oil	10⅔	10⅔	
Four 1-pint horizontal oilers, 1 in each trail box	.....	.....	
Total	22	20⅔	

Material for Painting.—Second coat and third coat olive paint for the wheeled matériel.

Brown enamel primer for painting horse collars, trace ch etc.

Rubberine paint for sealing blank charges.

Sal soda for removing dirt and grease before painting.

Powdered lyé for removing old paint.

Sandpaper for smoothing surfaces before painting.

Japan drier as an ingredient for hastening the drying.

Boiled linseed oil as an ingredient for hastening the dr and for making the paint more suitable for interior work.

law linseed oil as an ingredient for making the paint more
table for outside work.
urpentine for thinning paint.
ash and varnish brushes for painting.
iscellaneous Materials.—Borax as a flux in welding;
amel's hair brushes for removing dust and lint from optical
truments;
astile soap for cleaning leather;
hamois skin as a wiping cloth for instruments except on the
es;
rocus cloth for polishing metal;
mery cloth for cleaning metal by abrasion or wearing away
he surface;
. and H. or Paco soap for cleaning cloth and web equip-
t;
avaline for polishing metal, such as bearing surfaces of
ars, etc.;
usset leather dressing for polishing leather after cleaning;
addle soap as a dressing for leather;
oap polish as a substitute for lavaline;
ponges: Large size for washing carriages, small size for
ning leather;
aste as a wiper for general cleaning;
ax for rubbing on thread before sewing.

Cleaning of Carriages, Etc.

61. Frequent wiping or washing of all parts of the carriages
sirable not only for the purpose of keeping them clean, but
to aid in the detection of missing bolts, nuts, and split pins
of parts broken, cracked, or out of adjustment.
ckets and sponges are habitually used for washing car-
es. The use of a hose through which water is thrown
ibly against the carriage tends to wet parts which are not
y accessible for drying. When convenient, carriages may
auled into shallow water for washing.
ter washing, the carriages are dried with sponges or cloths.

Leather cases and straps are cleaned in a manner similar t that prescribed for harness (678–680).

Canvas covers are cleaned with water and H. and H. Paco soap (689). Leather parts fastened to the covers shou not be immersed in the water.

Lubrication.

662. It is of great importance that the matériel be kept pro erly lubricated. By that is meant the constant maintenance a thin film of the proper lubricant between all working an bearing surfaces and the surfaces on which they work or bea This film of lubricant is required in order that the parts ma function easily and without unnecessary wear.

The frequency with which the various mechanisms and par should be lubricated and the amount of lubricant that shou be applied in each case can not be definitely prescribed; the depend upon the conditions under which the matériel is bei used. It should be borne in mind, however, that too little c causes far more waste and damage than too much.

Oil holes are provided at various places where the surfac to be lubricated are not directly accessible. These holes shou be cleaned out frequently. Except during oiling, they should b fully closed by the means provided. Before oiling at an o hole wipe off carefully any dirt or grit near the opening tha might be carried down into it by the oil.

Before applying fresh lubricant the old should, if practicabl be wiped from the surfaces and the surfaces should be clea and free from grit. While applying lubricating oil the mecha nism is operated or the part is moved to insure the formatio of a complete oil film between the surfaces, and care must b taken, especially when lubricating through an oil hole in col weather, to see that sufficient oil actually reaches the proper surfaces. When oiling, cotton waste should be at hand and an oil that spills or runs upon surfaces where it is not required should be wiped up at once in order to prevent the accumulatio of dust and dirt.

e men are practiced in lubricating the various mechanisms
arts, and are thus taught the location of the oil holes and
points where oil should be applied, and the proper methods
ndling the oiler and waste.
tailed instructions with reference to the uses of the vari-
ils are contained in the Handbook.

Disassembling and Assembling.

1. In disassembling, if the parts can not be readily re-
d, the tendency of uninstructed men is immediately to use
reat force. By teaching them to exercise patience and in-
ty, this tendency will be checked and the frequent break-
f parts avoided. Metal parts should never be struck di-
with a hammer; a buffer of wood or soft metal should
s be interposed. The disassembled parts should be kept
ier while being cleaned and should be reassembled as soon
ssible.
assembling, a thin coating of oil is applied to all unpainted
parts, including especially the threads of bolts and nuts,
ler to prevent the formation of rust and to aid in the next
sembling. At points where friction may be developed when
matériel is in use, a lubricating oil is used; at other points
slushing oil. All nuts are secured by split pins, which
d be replaced and properly opened after the nuts are
ed home; threaded parts not secured by split pins are
d with copper wire to prevent unscrewing.
fore assembling it is advisable to paint those parts requir-
t that after assembling become more or less inaccessible.
doing, however, care must be taken to see that no bearing
ces are painted.

Repairs and Adjustments.

1. All cannoneers are taught to effect minor repairs such
e replacing of a worn-out brake shoe or of a damaged pole
to make simple adjustments such as the adjustment of the
es.

The more difficult repairs are made by the mechanics and noncommissioned officers.

Cleaning After Firing.

665. As soon as possible after firing, the bores of the g should be cleaned with a solution of ingredients in the fo ing proportion: One-half pound of sal soda to one gallon boiling water. They are then dried carefully and oiled.

Also, the exploded primers should be removed from the tridge cases and the cases washed by immersing them compl in a hot but somewhat weaker solution of sal soda; they then dried carefully. Neither acids nor solutions of acids be used for cleaning cartridge cases.

Painting.

666. Instructions with reference to the painting of the t tériel are contained in the Handbook.

The object of painting the matériel are to aid in its pres tion and to render it less visible when in the field.

Surfaces that become marred should be painted over wit waiting for an opportunity to paint the entire carriage.

The number of coats of paint that should be applied in period depends upon the conditions under which the matéri being used.

Section III.—The Wheeled Matériel.

667. In order to maintain the wheeled matériel in serv able condition and to practice the men in its care, all parts periodically disassembled, examined, cleaned, and assemb For this purpose a schedule of systematic cleaning will be lowed.

668. The cleaning schedule should be simple in operati should set forth briefly the routine work to be done each that the matériel is used, and the special work to be done f time to time; and the items of work included therein should such that together they constitute a thorough overhauling of

iages. The operations at which the presence of a commis-
ed officer is required by the provisions of the Handbook are
ılly omitted from a schedule arranged for the use of en-
d men, such work being performed when specially ordered.
69. Work on the carriages during cleaning periods is per-
ıed under the immediate supervision of the lieutenant as-
ed to Department A (82).
ıe chief mechanic is in direct charge of the work. He is
onsible that the requirements of the cleaning schedule are
plied with; that the parts broken, cracked, worn, or out
ıdjustment are detected and promptly repaired; that the
ssary materials and spare parts are obtained from the quar-
ıaster sergeant; that the tools and cleaning materials are
ıerly used, and that the carriages are left always in readi-
for immediate use.
70. On each day that the carriages are used, two periods
habitually be designated for their care; one before the car-
es leave park while the drivers are harnessing, the other
ng the first stables held after the return of the carriages to
t.
71. At the first period, the gunners and the Nos. 4, assisted
ther members of the gun squad, if present, look over their
es and caissons, oil wheels, etc., and see that the carriages
in every way prepared for use.
72. At the commencement of the period held during stables
8) the gunners, the Nos. 4, and such other cannoneers as
be needed for the work at hand, assemble at the park
re the chief mechanic notifies them of any special work re-
ed for the day. They then proceed with the regular clean-
and with the special work ordered.
he chief mechanic moves from carriage to carriage inspect-
the work and assisting wherever needed.
t the close of the period he accompanies the lieutenant in a
ful inspection of the carriages, and when so directed, sees
t the park is put in order and that the men are dismissed.
t this work an absent gunner is replaced by the caisson cor-
al of the same section. In caisson sections, one caisson

corporal is placed in charge of the caissons of his section
cleaning. Other caisson corporals, not required elsewhere,
present and assist at the cleaning of the carriages of th
sections.

673. If it is impracticable to care for the carriages dur
stables, other periods will be designated at which times
cleaning will be carried on in a manner similar to that
scribed above.

SECTION IV.—HARNESS AND HORSE EQUIPMENT.

674. Constant care is required to keep the harness and ho
equipment clean, serviceable, and in good repair, the leat
parts soft and pliable, the metal parts free from rust and
and properly painted.

Drivers and individually mounted men will be carefully
structed in the care of harness and horse equipment.

675. Harness and horse equipment will habitually be cle
immediately after use. This obligation, like the care of
horse, is to be regarded as a part of the mounted duty.
exercises will not be considered as completed until horses, h
ness, and equipment have been cared for and put in order.

The cleaning is performed under the immediate supervis
of the lieutenant assigned to Department B (32).

The chiefs of section are in direct charge of the work p
taining to their sections and are responsible that the clean
is carried out as ordered, that the materials issued are prop
expended; and that the harness is left in good order.

Ordinarily about 30 minutes should be allowed for a driv
to unharness his pair and properly care for and dispose of h
harness.

To do this the driver wipes and cleans with a damp cl
the bits, the bearing surfaces of the collars, and the leath
parts of the harness, paying particular attention to the pla
where the leather is wet from perspiration; dries the bits a
rubs them with a cloth damp with oil, and puts the harness
order. If the saddle blanket is wet, he leaves it uncovered

At this time, also, parts that should be repaired or replaced given to the chief of section, who is responsible that they promptly taken to and returned from the saddler or that necessary new parts are procured from the quartermaster ant.

6. Care should be exercised in handling all articles of har- and horse equipment. Saddles must not be dropped or wn about, as fractured arches or broken side bars may lt; collars must not be subjected to rough treatment, or they be bent out of shape and rendered unfit for use.

ch parts as stirrup straps, quarter straps, etc., should occa- lly be exchanged or be altered in length so as to bring holes at the buckles or fresh surfaces into wear.

7. The saddle blanket should be kept clean, soft, and free wrinkles. Occasionally it should be hung in the sun and l, and then beaten and brushed. When necessary it is oughly cleaned by repeated immersions in tepid soap suds then, without wringing or pressing, is hung over a pole or to dry.

8. At intervals of from one to four weeks, depending upon atic conditions and the use to which it has been subjected, harness should be completely taken apart and thoroughly hauled, cleaned, and dressed.

hen necessary the collars, trace chains, etc., should be ted.

clean and dress the harness: Take the harness completely t, unbuckling straps, removing buckles, loops, etc., wherever ible.

ith a sponge dampened but not wet with water wipe off urface dust and mud. Rinse out the sponge, moisten it in water, squeeze it until nearly dry, rub it vigorously upon ile soap, and work it about in the hand until a thick, creamy er is formed. Clean each leather piece thoroughly in this er, each strap being drawn its entire length through the ered sponge so as actually to remove therefrom the salt, it, and dirt.

Again rinse out the sponge and make a thick lather as scribed above except that saddle soap is used. Go over piece as before, working the lather well into every part. P the parts in the shade to dry.

While these parts are drying, clean the buckles and o metal parts of the harness.

After the leather parts have become partially dry, they rubbed vigorously with a soft cloth.

The harness is then assembled.

679. As long as the saddle soap dressing maintains leather soft and pliable nothing further is required, but f time to time it will be necessary to apply a little neat's oil. Frequent light applications are of more value than frequent heavy ones.

To oil the harness: Clean the leather parts in the lathe castile soap as described above.

While the parts are still damp apply the oil to the flesh of the leather with a cloth or cotton waste moistened but soaked with oil, using long, light strokes. A light even tribution of the oil should be sought. The tendency is to too much oil; the amount necessary for each set of har should rarely exceed two ounces. After oiling, the parts sh if practicable, be allowed to stand for 24 hours in a warm, shady place, and should then be rubbed with a dry cloth. harness is then assembled.

680. Detailed instructions for cleaning, dressing, and oi leather equipment are contained in Ordnance Pamphlet 1965.

Section V.—Range-Finding and Fire-Control and Signal Equipment.

681. The instructions contained in the Handbook, in O nance Pamphlet No. 1795, and in Signal Corps Manual No for the care and disassembling of the range-finding and fi control and signal equipment will be followed.

five strips of canvas of the same size. When used as a cushion it will be folded as follows: Spread the paulin on round and throw the ropes upon it; fold each outside strip the strip adjacent to it and continue to fold in this manntil the paulin is the size of a single strip; double it in ame direction; then fold both ends over, one falling above ther so that the folded paulin is one third the length of a place on the chest with the exposed end down.

metal ends of **picket ropes** will be kept free from rust, he hooks sufficiently open to be readily engaged in the

l kits will be kept complete and serviceable; edges of cold s free from nicks; drifts and punches properly shaped iles clean.

per wire is used to lash nuts and other threaded parts not ed by split pins to prevent unscrewing.

cial wrenches, spanners and other tools and accessories e used only for the purposes for which intended.

os are used only when in the field. The blades will be bright, sharp and well oiled; the scabbards clean.

truction will be given in different methods of using the **blocks** and **rope**, and in making the common **knots** and **es.**

riages in use will be equipped habitually with all articles eir prescribed equipment. The battery wagon and store n are habitually kept packed. When convenient, however, arious chests contained therein may be kept outside the ns for convenience in getting at their contents.

Materials for Cleaning and Preservation.

). The proper uses of the supplies furnished for the cleannd preservation of the battery equipment are set forth in l in the Handbook of the matériel and in Ordnance Pam- No. 1965.

general these materials are issued for the following pur-

briskly into the transmitter press the transmitter button sever times. If the blowing is clearly heard in the receiver when t button is pressed and not at all when it is released, the te phone element, the plug, cord, and its connections are in orde

If both tests are successful, the instrument is in servicea condition. If either of these tests fail, the faults should fir be localized and then repaired.

684. To locate faults the tests described below should b made preferably in the order given.

(1) Connect the line terminals and test as in (*b*), paragra **683**.

If this test is successful, while (*b*) was unsuccessful, t fault lies in the plug, cord, or its connections.

If when the button is pressed the blowing is not heard, b a very loud "clack" is heard in the receiver, the fault is short circuit in the transmitter proper. To repair a fault i the transmitter the rear cover may be removed, but furth than this the transmitter must never be opened except by a experienced person acting with the authority of the batte commander.

(2) Examine the key contacts. An imperfect upper contact a frequent source of trouble. The upper contact should be w made when the key is up, and broken when it is down. Th lower contacts should be broken when the key is up and mad when it is down, the one directly below the key handle bei made slightly later than the other one.

(3) The line terminals being disconnected, short-circuit th binding posts R and T with the instrument tool or some oth conductor.

If a loud click is heard, the receiver, its cord, the primar winding of the induction coil and the battery seated next to th hinge of the battery door are in order.

(4) Connect the line terminals. Remove the transmitter cor from binding post T; short-circuit the line terminals. If whe the transmitter binding posts are short-circuited a loud clic is heard in the receiver, the fault lies in the transmitter or i cords. Attach the transmitter cord to the binding post T; re

the cover from the back of the transmitter, and repeat this short-circuiting the points where the cords are attached e transmitter instead of short-circuiting the transmitter ıg posts. If a loud click is heard in the receiver, the is an open circuit in the transmitter proper.

Seat the plug firmly in the jack. Touch the ground rod e pole of a battery and the connector to the other. If a click is heard in the receiver, the receiver, its cords, the lary winding of the induction coil, the upper contact of y, and the battery are in good order.

s test may be used to determine the serviceability of a y.

. Flash lights are issued for use during night firing. with hoods are for issue to the instrument sergeant and gunners; those without hoods to the battery commander, connaissance officer, the executive and his officer assistant, ı each gun section to the chief of section, No. 1 and No. 3.

. Field glasses and such other articles of this equipment captain may desire will be issued to individuals before drill or exercise involving their use. Immediately there- they will be turned in and stored in such place as the n may direct.

SECTION VI.—INDIVIDUAL EQUIPMENT.

. The articles of individual equipment will be kept in able condition either by allowing the men to care for at their own time or by designating special periods for ork.

ither case the work is under the supervision of the lieu- in charge (32), and the chiefs of section are responsible t is properly carried on and that the necessary cleaning als are on hand, available for use and properly expended.

. All men will be instructed in the care and repair of this ıent, in accordance with the instructions contained in nce Pamphlet No. 1965.

. Articles of cloth equipment should be frequently well d with a stiff bristle or a dry scrub brush.

Leather cases and straps are cleaned in a manner similar t
that prescribed for harness (678–680).

Canvas covers are cleaned with water and H. and H.
Paco soap (689). Leather parts fastened to the covers shou
not be immersed in the water.

Lubrication.

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erly lubricated. By that is meant the constant maintenance
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Oil holes are provided at various places where the surfac
to be lubricated are not directly accessible. These holes shou
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fully closed by the means provided. Before oiling at an
hole wipe off carefully any dirt or grit near the opening th
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be wiped from the surfaces and the surfaces should be clea
and free from grit. While applying lubricating oil the mech
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of a complete oil film between the surfaces, and care must b
taken, especially when lubricating through an oil hole in co
weather, to see that sufficient oil actually reaches the prope
surfaces. When oiling, cotton waste should be at hand and a
oil that spills or runs upon surfaces where it is not require
should be wiped up at once in order to prevent the accumulatio
of dust and dirt.

. At formations for ceremony sabers are drawn. At cere-
s mounted the pieces are in front unless the formation is
ible section. Cannoneers mounted on the chests fold their

Mounted officers in facing toward the line and in re-
g their front always execute a left about.

f officers, when not otherwise prescribed, draw and return with their chief.

CHAPTER II.—REVIEWS.

SECTION I.—GENERAL RULES.

). The adjutant posts men or otherwise marks the points
the column changes direction in such manner that its in passing, will be about 10 yards from the reviewing

1. The post of the reviewing officer, usually opposite the
r of the line, is marked by a flag.

e reviewing officer should be at the flag before the head
e column reaches that point; before that time he may take
osition to observe the movements of the troops.

2. The staff of the reviewing officer is in single rank, six
s in rear of him, in the following order, from right to left:
of staff, officers of the general staff corps, adjutant gen-
aids, then the other members of the staff in the order of
, the senior on the right; the flag and orderlies place them-
s three yards in rear of the staff, the flag on the right.

icers of the same or higher grade, and distinguished per-
ges invited to accompany the reviewing officer, place them-
s on his left; their staffs and orderlies place themselves,
ectively, on the left of the staff and orderlies of the re-
ing officer; all others who accompany the reviewing officer
e themselves on the left of his staff, their orderlies in rear.
aff officer is designated to escort distinguished personages
to indicate to them their proper positions.

03. While riding around the troops the reviewing officer
direct his staff, flag and orderlies, to remain at the post of

PART VII.—CEREMONIES.

CHAPTER I.—GENERAL RULES.

697. On occasions of ceremony, except funerals and revie of large forces, troops will be arranged from right to left line, and from head to rear in column, in the following orde First, infantry; second, field artillery; third, cavalry. Ar lery, engineer, and signal corps troops, equipped as infant are posted as infantry; dismounted cavalry and marines tached to the Army are on the left of the infantry in the or named; companies or detachments of the hospital corps mounted detachments of engineers are assigned to places cording to the nature of the ceremony; mounted companies detachments of the signal corps are posted as cavalry. Wh cavalry and field artillery are reviewed together without oth troops, the artillery is posted on the left. Troops in column funeral escorts will be arranged from head to rear in the fo lowing order: First, cavalry; second, field artillery; third, fantry. In the same arm, regulars, militia in the service the United States, and volunteers are posted in line from ri to left, or in column from head to rear, in the order named. reviews of large bodies of troops the different arms and class are posted at the discretion of the commanding general, d regard being paid to their position in camp. On all other oc sions troops of all classes are posted at the discretion of t general or senior commander.

698. At formations for ceremony in which field artillery ganizations of different types take part, they are formed order from right to left in line, and from front to rear in c umn, as follows: Horse artillery, light artillery, heavy artiller mountain artillery.

). At formations for ceremony sabers are drawn. At cere-
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uble section. Cannoneers mounted on the chests fold their
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.ff officers, when not otherwise prescribed, draw and return
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fficers of the same or higher grade, and distinguished per-
ages invited to accompany the reviewing officer, place them-
'es on his left; their staffs and orderlies place themselves,
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wing officer; all others who accompany the reviewing officer
ce themselves on the left of his staff, their orderlies in rear.
staff officer is designated to escort distinguished personages
d to indicate to them their proper positions.

3. While riding around the troops the reviewing o
ıy direct his staff, flag and orderlies, to remain at the

the reviewing officer, or that only his personal staff and [illegible] shall accompany him; in either case the commanding of[illegible] alone accompanies the reviewing officer. If the reviewing of[illegible] is accompanied by his entire staff, the staff officers of the c[illegible] mander place themselves on the right of the staff of the [illegible] viewing officer.

The reviewing officer and others at the reviewing stand s[illegible] the standard as it passes; when passing around the troops [illegible] reviewing officer and those accompanying him salute the st[illegible] ard when passing in front of it.

The reviewing officer returns the salute of the command[illegible] officer of the troops only. Those who accompany the revie[illegible] officer do not salute.

704. The staff, flag, and orderlies of brigade comman[illegible] place themselves in the order prescribed for the staff, flag, [illegible] orderlies of the reviewing officer.

705. When the reviewing officer is not in front or in rear [illegible] regiment, its commander may cause it to stand **at ease**, to [illegible] or to **dismount** and **rest**, and to resume **attention** and mo[illegible] but so as not to interfere with the ceremony.

706. After saluting the reviewing officer, the command[illegible] officer of the troops turns out of the column and takes post [illegible] the right of the reviewing officer, his staff on the right of [illegible] reviewing officer's staff. When the rear element of his c[illegible] mand has passed, without changing his position, he salutes [illegible] reviewing officer and rejoins his command. The command[illegible] officer of the troops and his staff are the only ones who t[illegible] out of the column.

707. If the person reviewing the command is not mount[illegible] the commanding officer and his staff on turning out of the c[illegible] umn after passing the reviewing officer dismount preparat[illegible] to taking post. In such case the salute of the command[illegible] officer, prior to rejoining his command, is made with the ha[illegible] before remounting.

708. The formation for review may be modified to suit t[illegible] ground, and the **present saber** and the ride around the line [illegible] the reviewing officer may be dispensed with.

)9. If the post of the reviewing officer is on the left of the
mn, the troops march in review with the guide left; the
manding officer and his staff turn out of the column to the
taking post as prescribed above, but to the left of the
ewing officer.

10. Battalion commanders repeat the commands of their
mental commander.

Whenever the colonel faces the line to give commands, the
ors face at the same time; they resume their front after
ng the movement executed. All such commands are executed
n they have been repeated by the majors. When the com-
d is **Present saber**, the lieutenant colonel and the colonel's
f salute at the command of the colonel; the major's staff
ites at the command of the major; the colonel and the
jors salute after resuming their front; each staff returns to
carry at the command of its chief. The same rules apply to
colonels and majors and to the general's, colonel's, and
jor's staffs whenever the brigade commander faces the line
give commands.

When passing in review the staff of each commander salutes
l returns to the carry with him.

11. When the general, the colonel, or the major faces the
e to give commands, the staff and orderlies do not change
ition.

12. Each guidon and, when the rank of the reviewing officer
itles him to the honor, each regimental standard salutes
74) at the colonel's command, **Present saber**; and again in
ssing in review when 6 yards from the reviewing officer. The
imental standard and the guidons are raised at the command,
rry saber, or when they have passed 6 yards beyond the
iewing officer.

718. The band of each regiment plays while the reviewing
icer is passing in front and in rear of the regiment.

During the march in review each band, immediately after
ssing the reviewing officer, turns out of the column away from
e reviewing officer, takes post in front of and facing him,
ntinues to play until its regiment has passed, then ceases

playing and follows in rear of its regiment; the band of t following regiment commences to play as soon as the preced band has ceased. The musicians of each regiment, except th of the regimental and battalion commanders, are consolida in rear of the band.

If the band be not present, the musicians of each regime with the exceptions above noted, are consolidated and posted double rank in a position corresponding to that of the ba They conform to what is prescribed for the band, the ch trumpeter taking post and performing the duties of the dr major.

In a single battalion when no band is present the musici of the battalion, with the exception above noted, are formed single rank and posted as prescribed for the musicians of t regiment, conforming to what is prescribed for them.

714. If the rank of the reviewing officer entitles him to t honor, the prescribed national air is played by the band, or the standard, march or flourishes are sounded by the field mu when sabers are presented, and again in passing in review the moment the regimental standard salutes, by the musicia halted in front of the reviewing officer (**607**).

Musicians with the regimental or battalion commanders not sound the march or flourishes.

715. Light artillery passes in review at a walk or tr Horse artillery may also pass at a gallop.

When passing at the trot or gallop no salutes are made e cept by the commander of the troops when he leaves the r viewing officer.

716. When the command is to pass at an increased gait t band, or musicians, if no band be present, remains in front the reviewing officer and continues to play until the column h completed its first change of direction after passing the revie ing officer. As soon as the increased gait is taken up by t column the band plays in appropriate time, ceasing when t column has again completed the first change of direction aft passing the reviewing officer. Upon the completion of the r view, the band returns to the position it occupied before marc

review or is dismissed, as may be directed. If there be than one regiment the band of the last regiment in col- emains in front of the reviewing officer; the others turn the column when the increased gait is taken up by their tive regiments, and rejoin them, or are dismissed on the ation of the review.

. In reviews of brigades or larger commands each bat- after its rear has passed the reviewing officer 50 yards, an increased gait for 100 yards in order not to interfere he march of the column in rear.

troops having passed the reviewing officer, return to their by the most practicable routes, being careful not to delay arch of the troops in rear of them.

. When field artillery is reviewed in line with cavalry or ry, it is formed in line with the lead drivers of the pieces d on their front rank.

s line is marked by the guidons who precede the batteries e line, where they are established by the adjutant.

reel carts, battery wagons, store wagons, and field s do not accompany field artillery at reviews unless spe- ordered to do so. Such vehicles pass in review at the only.

. When it is necessary that an organization should be ed before an inspector junior in rank to the commanding , the commanding officer receives the review and is ac- nied by the inspector, who takes post on the command- ficer's left.

SECTION II.—BATTALION REVIEW.

. The battalion being in line, the major faces to the front, aff taking post in his rear; the reviewing officer moves a ards toward the major and halts; the major turns about, ands: 1. **Present**, 2. **SABER**, and again turns about and s.

e reviewing officer returns the salute; the major turns , brings the battalion to carry saber and again turns to ont.

briskly into the transmitter press the transmitter button sever times. If the blowing is clearly heard in the receiver when t button is pressed and not at all when it is released, the te phone element, the plug, cord, and its connections are in ord

If both tests are successful, the instrument is in service condition. If either of these tests fail, the faults should fi be localized and then repaired.

684. To locate faults the tests described below should made preferably in the order given.

(1) Connect the line terminals and test as in (*b*), paragra 683.

If this test is successful, while (*b*) was unsuccessful, t fault lies in the plug, cord, or its connections.

If when the button is pressed the blowing is not heard, a very loud "clack" is heard in the receiver, the fault is short circuit in the transmitter proper. To repair a fault the transmitter the rear cover may be removed, but furt than this the transmitter must never be opened except by experienced person acting with the authority of the batt commander.

(2) Examine the key contacts. An imperfect upper contact a frequent source of trouble. The upper contact should be m made when the key is up, and broken when it is down. T lower contacts should be broken when the key is up and ma when it is down, the one directly below the key handle be made slightly later than the other one.

(3) The line terminals being disconnected, short-circuit binding posts R and T with the instrument tool or some ot conductor.

If a loud click is heard, the receiver, its cord, the prim winding of the induction coil and the battery seated next to hinge of the battery door are in order.

(4) Connect the line terminals. Remove the transmitter co from binding post T; short-circuit the line terminals. If wh the transmitter binding posts are short-circuited a loud cl is heard in the receiver, the fault lies in the transmitter or cords. Attach the transmitter cord to the binding post T;

the cover from the back of the transmitter, and repeat this short-circuiting the points where the cords are attached transmitter instead of short-circuiting the transmitter g posts. If a loud click is heard in the receiver, the is an open circuit in the transmitter proper.

Seat the plug firmly in the jack. Touch the ground rod pole of a battery and the connector to the other. If a lick is heard in the receiver, the receiver, its cords, the lary winding of the induction coil, the upper contact of y, and the battery are in good order.

test may be used to determine the serviceability of a y.

Flash lights are issued for use during night firing. with hoods are for issue to the instrument sergeant and gunners; those without hoods to the battery commander, onnaissance officer, the executive and his officer assistant, each gun section to the chief of section, No. 1 and No. 3.

Field glasses and such other articles of this equipment captain may desire will be issued to individuals before rill or exercise involving their use. Immediately there- hey will be turned in and stored in such place as the t may direct.

SECTION VI.—INDIVIDUAL EQUIPMENT.

The articles of individual equipment will be kept in able condition either by allowing the men to care for t their own time or by designating special periods for ork.

ther case the work is under the supervision of the lieu- in charge (32), and the chiefs of section are responsible is properly carried on and that the necessary cleaning ils are on hand, available for use and properly expended.

All men will be instructed in the care and repair of this ent, in accordance with the instructions contained in ce Pamphlet No. 1965.

Articles of cloth equipment should be frequently well with a stiff bristle or a dry scrub brush.

the grave; the coffin is then carried along the front of t escort to the grave, sabers are presented, and the band p an appropriate air; the coffin having been placed over grave, the music ceases and sabers are brought to the carry.

The commander next commands: 1. Parade, 2. REST.

At the second command the cannoneers execute parade and incline the head.

After the coffin is lowered into the grave and the fu services are completed the commander of the escort comm 1. Battery (or platoon), 2. ATTENTION, and then fires thre leys of one round each with blank cartridges. In this cas command will be: 1. Fire by battery (platoon, etc.), 2. Bat (platoon, etc.), 3. FIRE. After the last volley a musi sounds taps over the grave.

The escort is then formed into column, marched to the p where it was assembled, and dismissed.

The band does not play until it has left the inclosure.

The funeral ceremony for an enlisted man is the same as an officer, except that the commands Present saber and C saber are omitted; the sergeant in command of the escort sal with the hand on the appearance of the coffin at the quar of the deceased and also when the coffin is carried along front of the escort to the grave.

746. When the distance to the place of interment is con erable, the escort after leaving the camp or garrison may ma at ease until it approaches the burial ground, when it is bro to attention. The music does not play while marching at e

In marching at attention the field music may alternate w the band in playing.

747. When it is impracticable for the carriages to appro the grave, they are left outside the inclosure. If the esc consists of Artillery only, the officers and mounted men, exc horseholders of horse artillery and drivers, dismount, turn o their horses to the horseholders of horse artillery or the driv

The officers draw saber; the gun squads are next formed column of squads; the coffin is then escorted to the grave, wh line is formed and the same ceremonies are performed as

prescribed. The ceremony at the grave having been com-
ed, the gun squads are marched to the guns and three vol-
are fired; after the last volley a musician sounds taps
the grave.

748. Should the entrance to the cemetery prevent the hearse
ompanying the escort till the latter halts at the grave, the
mn is halted at the entrance long enough to take the coffin
n the hearse, when the column is again put in march. The
alry and Artillery of the escort, when unable to enter the
losure, turn out of the column and salute the coffin as it
ses.

749. In all funeral ceremonies six pallbearers will be selected
far as practicable from the grade of the deceased. If the
eased is a commissioned officer, the coffin is borne by six
commissioned officers; if a noncommissioned officer or pri-
e, by six privates.

750. When arms are presented at the funeral of a person en-
ed to any of the following honors, the band plays the
scribed national air, or the field music sounds to the stand-
, march or flourishes, according to the rank of the deceased,
er which the band plays an appropriate air.

After the remains are deposited in the grave a salute corre-
nding to the rank of the deceased will be fired, in addition
three volleys of artillery or of musketry.

751. At the funeral of a mounted officer or enlisted man, his
se, in mourning caparison, follows the hearse.

752. When necessary to escort the remains from the quarters
the deceased to the church before the funeral service, arms
presented upon receiving the remains at the quarters and
o as they are borne into the church.

753. Before the funeral the commander of the escort gives
clergyman and pallbearers all needed directions.

CHAPTER VI.—GUARD MOUNTING.

754. At the assembly, the men designated for guard fall in on
eir battery parade ground (97), noncommissioned officers in
e line of file closers. The first sergeant verifies the detail,

At this command the gun platoons are unlimbered and p pared for firing. The chiefs of the other platoons move t platoons to the rear by a left about, and, after gaining suffi distance, execute a second left about and form their plat in double section line abreast of the limbers of the gun secti

The chief of the first and second platoons take post oppo the center and 4 yards in front of the line of muzzles of t platoons. The chiefs of the other platoons take post oppo the center and 4 yards in front of the lead drivers of t platoons.

All the carriages being in position, the captain comman 1. **Right,** 2. **DRESS,** verifies the alignment of the officers and two ranks of carriages, commands: **FRONT,** and posts him when not acting as inspector, opposite the center of the bat and 8 yards in front of the line of muzzles.

The ninth section constitutes an additional platoon, whic commanded by the senior sergeant with it (488). When ninth section is not present its personnel is assigned as scribed in paragraph 486.

The guidon is 4 yards from the right flank of the lim limbers, abreast of the lead drivers; the musicians on the r of the guidon, all boot to boot.

The chiefs of section cause all limber, caisson, and w chests to be opened for inspection.

When acting as inspector the captain inspects the chief platoon from right to left; passes by the rear of the batter the post of the first sergeant and inspects him; thence by rear of the battery to the right flank, where he returns s and inspects the musicians and guidon.

He goes to the right section of the right platoon and insp the section, commencing with the chief of section, passing order to the caisson, the gun, and the limbers. He then s larly inspects the other sections in order from right to left.

When the captain commences the inspection of the r platoon the chiefs of the other platoons cause their platoons stand at ease, calling them to attention as the captain proaches their platoons. Each chief of platoon accompanies

ain during the inspection of his platoon. As soon as a
oon is inspected its commander causes it to take the **march**
r and then to stand at **ease.** The platoon commander faces
platoon while at **ease.**

ie inspection being completed, the captain limbers front and
and commands: 1. **Form double section line,** 2. **MARCH.**
: the second command the first and second platoons execute
movement (568); the chiefs of the other platoons move
r platoons in double section up on the line established by
caissons of the gun sections.

31. The battery carries for inspection every article that is
cribed as part of its regular equipment and for which there
specially designated place.

32. Should the inspector be other than the captain, the
r, having prepared his battery for inspection and taken his
, salutes when the inspector arrives in front of him. The
ector returns the salute, inspects the captain, and then in-
ts the battery in the order just described. As soon as in-
ted the captain returns saber and accompanies the inspector.

Dismounted.

33. The battery being in line, the captain causes the ranks
e opened and commands: **Prepare for inspection (119).** At
: command the lieutenants carry saber.

34. The captain returns saber, inspects the chiefs of pla-
, the front rank, the rear rank, and the file closers, begin-
; on the right of each and returning by the left and rear.
ing the inspection of the ranks the lieutenants face about
stand at ease; they may be directed to accompany the
tain or to assist in the inspection. Upon the completion of
inspection the lieutenants face to the front and resume the
ntion; the captain closes the ranks and dismisses the bat-
.

35. Should the inspector be other than the captain, the latter
as ranks and, when the inspector approaches, brings the bat-

tery to attention, faces to the front, and salutes. The sal
acknowledged, the captain carries saber, faces about, comman
Prepare for inspection, and again faces to the front.

The inspection proceeds as before; the captain returns sa
and accompanies the inspector as soon as the latter has
spected him.

At inspection of quarters the inspector is accompanied by
captain and followed by the other officers, or by such of th
as he may designate; the men, without accouterments, st
uncovered near their respective bunks; in camp they stand c
ered, without accouterments, in front of their tents; upon
approach of the inspector the first sergeant commands: **ATT
TION,** salutes, if covered, and leads the way through
quarters or camp.

SECTION III.—BATTALION INSPECTION.

736. The battalion being in column of batteries, in do
section, on the approach of the inspector the major comman
1. **Prepare for inspection,** 2. **MARCH.**

The batteries are prepared for inspection as already p
scribed.

The musicians join their batteries. The drum major cond
the band, if there be one, to the rear of the column, pass
by the right flank, and places it, facing to the front, 36 y
in rear of the battery and opens ranks.

The battalion staff officers place themselves in line, with 1-y
intervals, about 40 yards in front of the column, opposite
center, in order of rank, from right to left; the noncomm
sioned staff and the noncommissioned officers of the headqu
ters detachment form at 1-yard intervals 3 yards in rear of t
staff officers; the privates are similarly posted 3 yards in re
of the noncommissioned officers. The reel cart takes post
prescribed in paragraph 575, the chest being opened at t
command **Prepare for inspection, March.** The guard of t
standard marches to the front and takes post 6 yards in re

center of the line of privates. The major takes post in
f the center of the column 6 yards in front of the staff.
inspector inspects the major and, accompanied by the
inspects the staff officers.
major and his staff, as soon as inspected, return saber
company the inspector.
adjutant gives the commands for the inspection of the
missioned staff.
inspector, commencing at the head of the column, inspects
ncommissioned staff, the guard of the standard, the bat-
in their order in column, and the band. The noncommis-
staff and the guard of the standard may be dismissed
n as inspected.
captain of each battery not undergoing inspection dis-
s his drivers and brings the men to rest. As the inspector
ches the battery the captain brings it to attention and
s the drivers; as soon as he himself has been inspected
urns saber, and accompanies the inspector. The inspector
ds as in battery inspection. At its completion the captain
s the carriages, forms double section line to the front,
unts his drivers, and brings the battery to rest. Upon
ition from the inspector the major may direct that each
y in turn be dismissed as soon as inspected.
band plays during the inspection of the batteries.
en the inspector approaches the band the adjutant com-
s: 1. **Inspection, 2. INSTRUMENTS**, and the band is in-
d as prescribed in paragraph 787.
. The battalion may be inspected in line. The inspection
ducted according to the same principles as when formed in
n. The major, his staff, noncommissioned staff, head-
ers detachment, and reel cart are inspected at their posts
nt of the center of the line; the band, which remains at its
on the right, is next inspected; then the batteries and the
d of the standard in their order from right to left.
8. If the major is himself the inspector the inspection is
cted according to the same principles.

playing and follows in rear of its regiment; the band of t following regiment commences to play as soon as the preced band has ceased. The musicians of each regiment, except th of the regimental and battalion commanders, are consolida in rear of the band.

If the band be not present, the musicians of each regim with the exceptions above noted, are consolidated and posted double rank in a position corresponding to that of the ba They conform to what is prescribed for the band, the ch trumpeter taking post and performing the duties of the dr major.

In a single battalion when no band is present the musici of the battalion, with the exception above noted, are formed single rank and posted as prescribed for the musicians of regiment, conforming to what is prescribed for them.

714. If the rank of the reviewing officer entitles him to honor, the prescribed national air is played by the band, or the standard, march or flourishes are sounded by the field mu when sabers are presented, and again in passing in review the moment the regimental standard salutes, by the musici halted in front of the reviewing officer (**607**).

Musicians with the regimental or battalion commanders not sound the march or flourishes.

715. Light artillery passes in review at a walk or tr Horse artillery may also pass at a gallop.

When passing at the trot or gallop no salutes are made cept by the commander of the troops when he leaves the viewing officer.

716. When the command is to pass at an increased gait t band, or musicians, if no band be present, remains in front the reviewing officer and continues to play until the column h completed its first change of direction after passing the revie ing officer. As soon as the increased gait is taken up by t column the band plays in appropriate time, ceasing when t column has again completed the first change of direction aft passing the reviewing officer. Upon the completion of the view, the band returns to the position it occupied before marc

review or is dismissed, as may be directed. If there be than one regiment the band of the last regiment in col- emains in front of the reviewing officer; the others turn the column when the increased gait is taken up by their tive regiments, and rejoin them, or are dismissed on the iation of the review.

. In reviews of brigades or larger commands each bat- , after its rear has passed the reviewing officer 50 yards, an increased gait for 100 yards in order not to interfere he march of the column in rear.

troops having passed the reviewing officer, return to their by the most practicable routes, being careful not to delay arch of the troops in rear of them.

. When field artillery is reviewed in line with cavalry or try, it is formed in line with the lead drivers of the pieces d on their front rank.

s line is marked by the guidons who precede the batteries e line, where they are established by the adjutant.

e reel carts, battery wagons, store wagons, and field as do not accompany field artillery at reviews unless spe- ordered to do so. Such vehicles pass in review at the only.

9. When it is necessary that an organization should be wed before an inspector junior in rank to the commanding r, the commanding officer receives the review and is ac- anied by the inspector, who takes post on the command- fficer's left.

SECTION II.—BATTALION REVIEW.

0. The battalion being in line, the major faces to the front, taff taking post in his rear; the reviewing officer moves a yards toward the major and halts; the major turns about, mands: 1. **Present**, 2. **SABER**, and again turns about and tes.

he reviewing officer returns the salute; the major turns ut, brings the battalion to carry saber and again turns to front.

The reviewing officer approaches to within about six y of the major; the latter salutes, returns saber, joins th viewing officer, takes post on his right, and accompanies around the battalion. The reviewing officer proceeds to right of the band, passes along the front to the left of the and returns to the right, passing in rear of the line. Th viewing officer and those accompanying him salute the stan when passing in front of it.

While the reviewing officer is riding around the battalion band plays, ceasing when he leaves the right to return to post.

On arriving again at the right of the line the major sal halts, and, when the reviewing officer and staff have pa moves directly to his post in front of the battalion, face draws saber, and commands: 1. **By the right flank**, 2. **MA** 3. **Battalion**, 4. **HALT.** The command **halt** is given as soo the carriages have completed the turn. The band takes 36 yards in front of the leading battery.

The column being formed, the major commands: 1. **Pa review**, 2. **Forward**, 3. **MARCH**, 4. **Guide right.** At the mand **march** the column marches off, the band playing. Wit command from the major, the column changes direction at points indicated, and column of batteries at full distances guide to the right is formed successively to the left at second change of direction. The major takes his post 24 y in front of the band, immediately after the second change. band, having passed the reviewing officer, turns to the left of the column, takes post in front of and facing the revie officer and remains there until the review terminates.

When the major is six yards from the reviewing officer and his staff salute, turning the head and eyes sharply to right. When the major has passed six yards beyond the viewing officer they resume the carry, turning the head and e to the front.

The other officers, noncommissioned staff officers, the dr major, and noncommissioned officers commanding plate

te at the point described for the major, turning the head eyes as above described.

ıe reviewing officer returns the salutes of the major only salutes the standard.

ıe major, having saluted, takes post on the right of the ewing officer, remains there until the rear of the battalion passed, then salutes and rejoins his battalion. The band es to play when the column has completed its first change irection after passing the reviewing officer.

hen sufficient space is available the leading battery executes he right flank after passing at least 100 yards beyond the ewing officer and then by three times executing **column left** rns to the ground originally occupied in column. The re- ıing batteries execute the same movements successively on same ground.

hen the space is restricted the major gives the necessary rs for the changes of direction after passing the reviewing er. So long as the battalion is brought back in flank col- ı, caissons on the right, to its original position in column it f no importance whether the several batteries are right or in front.

hen the battalion arrives on the ground originally occupied ɔlumn the major commands: **1. Trot, 2. MARCH.**

he battalion passes in review as before, except that the ıoneers' arms are not folded and that no salutes are ren- d, except by the major when he leaves the reviewing officer. he review terminates when the rear battery has passed the ewing officer; the band then ceases to play and rejoins the alion or is dismissed. The major and his staff rejoin the alion.

he reviewing officer may prescribe how often the column l pass in review and the gait or gaits to be used.

Review of a Battalion with Closed Intervals.

21. The battalion is formed in line, each battery being at ed intervals. The review is conducted according to the ıciples previously explained, except that instead of first

forming flank column the battalion is formed in column of t teries with closed intervals but full distances and passes review in that formation.

SECTION III.—REGIMENTAL REVIEW.

722. The regiment may be formed in line with full or cl intervals, in line of masses or in such other formation as nature of the ground and the presence of other troops n necessitate.

When the formation is in line with full intervals, the col takes post facing to the front and the review proceeds as scribed for the battalion review, substituting "colonel" "major" and "regiment" for "battalion."

In riding around the regiment the reviewing officer pass the left in rear of the line of majors, then returns in rea the line of carriages to the right.

At the second change of direction each major takes pos yards in front of his leading battery. When at closed inter this distance is suitably reduced.

723. When the regiment is formed in line with closed tervals, the rules for the review of a battalion in line closed intervals apply.

724. When in line of masses or other formation, the re is conducted according to the same principles, each bat being placed in march in time to follow the preceding one the proper distance.

SECTION IV.—BRIGADE REVIEW.

725. The brigade is formed and prepared for review as plained for the regiment. The brigade commander and s take post about 30 yards in front of the line of colonels, wh in line; about 30 yards in front of the leading colonel, when column.

The review is conducted according to the principles laid do for regimental review, the brigade commander taking pos yards in front of the leading colonel when at about 100 ya from the reviewing officer.

SECTION V.—GARRISON REVIEW.

86. A review of a body of troops less than a division, com-
l of different arms, is conducted on the principles laid down
ı regiment.

ıe senior line officer present commands the review; the
ır line officer present with each arm commands that arm.
troops of each arm form on the line according to the prin-
s prescribed in the regulations for that arm.

ch commander gives the commands necessary to carry out
rders of the officer commanding the review.

ounted troops will not be put in march to pass in review
the rear element of the foot troops has completed the
ıd change of direction. The commanding officer, having
ed the reviewing officer, turns out and joins him. The other
nanders do not turn out of the column.

CHAPTER III.—INSPECTIONS.

SECTION I.—GENERAL RULES.

87. The inspector prescribes the kind of inspection which
esires.

88. If there be both inspection and review, the inspection
either precede or follow the review.

hen an inspection follows a review with the other arms the
l Artillery proceeds, at the proper time, to the place desig-
d by the inspector and is inspected separately.

89. The inspections herein prescribed partake in part of
ıature of ceremonies. Such inspections do not in any sense
ıce the detailed inspections which organization and other
nanders should make of matériel, equipment, etc.

SECTION III.—BATTERY INSPECTION.

Mounted.

90. The battery being in double section line, the captain
mands: 1. Prepare for inspection. 2. ACTION FRONT.

At this command the gun platoons are unlimbered and p pared for firing. The chiefs of the other platoons move t platoons to the rear by a left about, and, after gaining suffic distance, execute a second left about and form their plato in double section line abreast of the limbers of the gun secti

The chief of the first and second platoons take post oppo the center and 4 yards in front of the line of muzzles of t platoons. The chiefs of the other platoons take post oppo the center and 4 yards in front of the lead drivers of t platoons.

All the carriages being in position, the captain comma 1. **Right,** 2. **DRESS,** verifies the alignment of the officers and two ranks of carriages, commands: **FRONT,** and posts him when not acting as inspector, opposite the center of the ba and 8 yards in front of the line of muzzles.

The ninth section constitutes an additional platoon, whi commanded by the senior sergeant with it (488). When ninth section is not present its personnel is assigned as scribed in paragraph 486.

The guidon is 4 yards from the right flank of the lin limbers, abreast of the lead drivers; the musicians on the r of the guidon, all boot to boot.

The chiefs of section cause all limber, caisson, and c chests to be opened for inspection.

When acting as inspector the captain inspects the chie platoon from right to left; passes by the rear of the batte the post of the first sergeant and inspects him; thence by rear of the battery to the right flank, where he returns and inspects the musicians and guidon.

He goes to the right section of the right platoon and ins the section, commencing with the chief of section, passi order to the caisson, the gun, and the limbers. He then s larly inspects the other sections in order from right to left.

When the captain commences the inspection of the r platoon the chiefs of the other platoons cause their platoo stand at ease, calling them to attention as the captain proaches their platoons. Each chief of platoon accompanies

in during the inspection of his platoon. As soon as a on is inspected its commander causes it to take the march and then to stand at ease. The platoon commander faces latoon while at ease.

e inspection being completed, the captain limbers front and and commands: 1. Form double section line, 2. MARCH. the second command the first and second platoons execute movement (568); the chiefs of the other platoons move platoons in double section up on the line established by aissons of the gun sections.

1. The battery carries for inspection every article that is ribed as part of its regular equipment and for which there specially designated place.

2. Should the inspector be other than the captain, the r, having prepared his battery for inspection and taken his salutes when the inspector arrives in front of him. The ctor returns the salute, inspects the captain, and then in- s the battery in the order just described. As soon as in- ted the captain returns saber and accompanies the inspector.

Dismounted.

3. The battery being in line, the captain causes the ranks e opened and commands: Prepare for inspection (119). At command the lieutenants carry saber.

4. The captain returns saber, inspects the chiefs of pla- , the front rank, the rear rank, and the file closers, begin- on the right of each and returning by the left and rear. ing the inspection of the ranks the lieutenants face about stand at ease; they may be directed to accompany the ain or to assist in the inspection. Upon the completion of inspection the lieutenants face to the front and resume the tion; the captain closes the ranks and dismisses the bat-

5. Should the inspector be other than the captain, the latter ranks and, when the inspector approaches, brings the bat-

tery to attention, faces to the front, and salutes. The salu acknowledged, the captain carries saber, faces about, command **Prepare for inspection,** and again faces to the front.

The inspection proceeds as before; the captain returns sal and accompanies the inspector as soon as the latter has i spected him.

At inspection of quarters the inspector is accompanied by t captain and followed by the other officers, or by such of th as he may designate; the men, without accouterments, st uncovered near their respective bunks; in camp they stand c ered, without accouterments, in front of their tents; upon t approach of the inspector the first sergeant commands: **ATT TION,** salutes, if covered, and leads the way through t quarters or camp.

SECTION III.—BATTALION INSPECTION.

736. The battalion being in column of batteries, in dou section, on the approach of the inspector the major command 1. **Prepare for inspection,** 2. **MARCH.**

The batteries are prepared for inspection as already p scribed.

The musicians join their batteries. The drum major condu the band, if there be one, to the rear of the column, passi by the right flank, and places it, facing to the front, 36 yar in rear of the battery and opens ranks.

The battalion staff officers place themselves in line, with 1-ya intervals, about 40 yards in front of the column, opposite t center, in order of rank, from right to left; the noncomm sioned staff and the noncommissioned officers of the headqua ters detachment form at 1-yard intervals 3 yards in rear of t staff officers; the privates are similarly posted 3 yards in re of the noncommissioned officers. The reel cart takes post prescribed in paragraph 575, the chest being opened at t command **Prepare for inspection, March.** The guard of t standard marches to the front and takes post 6 yards in re

center of the line of privates. The major takes post in
of the center of the column 6 yards in front of the staff,
inspector inspects the major and, accompanied by the
inspects the staff officers.
major and his staff, as soon as inspected, return saber
company the inspector.
adjutant gives the commands for the inspection of the
nmissioned staff.
inspector, commencing at the head of the column, inspects
ncommissioned staff, the guard of the standard, the bat-
in their order in column, and the band. The noncommis-
staff and the guard of the standard may be dismissed
n as inspected.
captain of each battery not undergoing inspection dis-
s his drivers and brings the men to rest. As the inspector
aches the battery the captain brings it to attention and
s the drivers; as soon as he himself has been inspected
urns saber, and accompanies the inspector. The inspector
ds as in battery inspection. At its completion the captain
's the carriages, forms double section line to the front,
unts his drivers, and brings the battery to rest. Upon
ition from the inspector the major may direct that each
y in turn be dismissed as soon as inspected.
band plays during the inspection of the batteries.
en the inspector approaches the band the adjutant com-
: 1. **Inspection**, 2. **INSTRUMENTS**, and the band is in-
d as prescribed in paragraph 787.
. The battalion may be inspected in line. The inspection
ducted according to the same principles as when formed in
n. The major, his staff, noncommissioned staff, head-
ers detachment, and reel cart are inspected at their posts
nt of the center of the line; the band, which remains at its
on the right, is next inspected; then the batteries and the
of the standard in their order from right to left.
. If the major is himself the inspector the inspection is
cted according to the same principles.

SECTION IV.—REGIMENTAL INSPECTION.

739. The commands and means are the same as prescribed a battalion.

In column the staff of the colonel forms in line at inter of 1 yard about 30 yards in front of the major of the battalion, the adjutant on the right, the other staff officer order of rank from right to left. The lieutenant colonel the right of the staff. The noncommissioned staff, headqua detachment, guard of the standard, and reel cart form manner similar to that prescribed for battalion inspection. colonel takes post 12 yards in front of the center of his sta The inspector inspects the colonel, and, accompanied by latter, inspects the lieutenant colonel and staff officers.

The colonel, lieutenant colonel, and staff, as soon as inspe return saber and accompany the inspector.

Commencing at the head of the column, the inspector ins the noncommissioned staff, headquarters detachment, guar the standard, each battalion in succession, and the band.

The major of a battalion not undergoing inspection dismo his drivers and brings the battalion to rest. On the appr of the inspector the major brings his battalion to atten mounts the drivers, and accompanies the inspector through battalion. The inspection is conducted as in battalion ins tion, each captain dismounting his drivers and resting his tery while not undergoing inspection.

When the inspection of a unit is completed the colonel, intimation from the inspector, may direct that it be mar off and dismissed.

The adjutant gives the commands for the inspection of regimental noncommissioned staff, guard of the standard, band.

740. The regiment may be inspected in line. The inspec is conducted according to the same principles as when for in column. The field, staffs, noncommissioned staffs, and h quarters detachments are inspected at their posts in front the line: the band, which remains at its post on the right

inspected; then the batteries and the guard of the standard
ieir order from right to left.

CHAPTER IV.—MUSTER.

Regimental, Battalion, or Battery Muster.

11. Muster is held in line or in column of batteries, car-
es limbered, drivers and cannoneers mounted.
ie adjutant is provided with the muster roll of the field,
, headquarters detachment, and band; each captain, with
roll of his battery. A list of absentees alphabetically ar-
ed, showing cause and place of absence, accompanies each

i the mustering officer approaches a battery, its captain
nands: **ATTENTION TO MUSTER.** The mustering officer or
aptain then calls the names on the roll, and as each man's
e is called, he answers **Here** and dismounts. After muster
nustering officer verifies the presence of the men reported in
ital, on guard, etc.
a battery is mustered dismounted the ranks are opened, and
ach man's name is called he answers **Here** and steps 1 pace
ie front.

CHAPTER V.—ESCORTS.

Section I.—Escort of the Standard.

12. The regiment being in line, the colonel details a battery
eceive and escort the national standard to its place in line.
ing the ceremony the regimental standard remains with the
d of the standard at its post with the regiment.
ie escort is formed in flank column, the band in front, the
onal standard bearer at the center of the column. The
rt then marches without music to the colonel's office or
ters, is formed in line facing the entrance and halted, the
l on the right, the standard bearer midway between the two
er sections on a line with the muzzles.

The senior lieutenant, the standard bearer, and a serge designated by the commander of the escort dismount in fr of the colonel's quarters, their horses being held by a musici The standard bearer, preceded by the lieutenant and follo by the sergeant, then goes to receive the standard.

The standard bearer comes out, followed by the lieuten and sergeant. They mount and form facing the center of escort, the lieutenant on the right, the sergeant on the left, musician returning to his post. The captain then comma 1. **Present**, 2. **SABER**; the officers of the escort present sa the musicians with the band sounding to the standard, and guidon saluting.

The sabers are brought to the carry; the lieutenant and geant return to their posts; the battery moves to the right fl the band conforming to the movement, the standard be placing himself at the center of the column.

The escort marches with the guide left back to the regim the band playing. The march is so conducted that when escort arrives at 90 yards in front of the right of the regim the direction of the march shall be parallel to its front. W the standard arrives opposite its place in line the escort formed in line to the left and halted. The standard bea passing between the carriages, advances and halts 12 yards front of the colonel.

The standard bearer having halted, the colonel, who h posted himself 40 yards in front of the center of his regim faces the line and commands: 1. **Present**, 2. **SABER.** At t command officers present saber and the regimental stand and the guidons salute. The colonel faces to the front a salutes, the musicians sounding to the standard.

The colonel then faces about and commands: 1. **Carry**, **SABER.** At the second command the carry is resumed. T standard bearer moves at a walk toward the regiment, a passing by the left of the guard of the standard executes a h about and takes his place in the guard.

The escort presents and carries saber with the regiment, the command of the colonel. As soon as the standard h

l its place in line the captain forms the escort in column
arches it, preceded by the band, to its place in line, pass-
and the left flank of the regiment.
band plays until the escort passes the left of the line,
t ceases playing and returns to its place on the right,
; in rear of the regiment.
regiment may be brought to rest after the escort has
the left of the line.
. If but one battalion of the regiment is present, escort of
ndard is executed according to the same principles.
. If it is impracticable for the battery detailed as escort
roach the colonel's quarters or office and to form opposite
bove described, then the battery is marched to the most
le place near by and there formed. The standard is then
it out as before, and is similarly saluted and received by
cort.

SECTION II.—FUNERAL ESCORT.

. The composition and strength of the escort are pre-
d in Army Regulations.
escort is formed with its center opposite the quarters of
eceased, the cannoneers mounted, the band, or musicians,
at flank of the escort toward which it is to march.
on the appearance of the coffin the commander of the escort
ands: 1. **Present**, 2. **SABER**, and the band plays an appro-
air; sabers are then brought to the carry.
e escort is then formed in flank or section column.
e procession is formed in the following order: 1, music;
ort; 3, clergy; 4, coffin and pallbearers; 5, mourners; 6,
ers of the former command of the deceased; 7, other
rs and enlisted men; 8, distinguished persons; 9, delega-
; 10, societies; 11, civilians.
icers and enlisted men, with side arms, are in the order of
, seniors in front.
e escort marches at a walk to solemn music, and on arriv-
at the grave is formed in battery, with the center opposite

the grave; the coffin is then carried along the front of t escort to the grave, sabers are presented, and the band pl an appropriate air; the coffin having been placed over grave, the music ceases and sabers are brought to the carry.

The commander next commands: 1. **Parade, 2. REST.**

At the second command the cannoneers execute parade r and incline the head.

After the coffin is lowered into the grave and the fun services are completed the commander of the escort comma 1. **Battery (or platoon), 2. ATTENTION,** and then fires three leys of one round each with blank cartridges. In this case command will be: 1. **Fire by battery (platoon, etc.),** 2. **Batt (platoon, etc.),** 3. **FIRE.** After the last volley a music sounds taps over the grave.

The escort is then formed into column, marched to the p where it was assembled, and dismissed.

The band does not play until it has left the inclosure.

The funeral ceremony for an enlisted man is the same as an officer, except that the commands **Present saber** and C saber are omitted; the sergeant in command of the escort salu with the hand on the appearance of the coffin at the quart of the deceased and also when the coffin is carried along front of the escort to the grave.

746. When the distance to the place of interment is con erable, the escort after leaving the camp or garrison may ma at ease until it approaches the burial ground, when it is brou to attention. The music does not play while marching at e

In marching at attention the field music may alternate w the band in playing.

747. When it is impracticable for the carriages to appro the grave, they are left outside the inclosure. If the esc consists of Artillery only, the officers and mounted men, exc horseholders of horse artillery and drivers, dismount, turn o their horses to the horseholders of horse artillery or the drive

The officers draw saber; the gun squads are next formed column of squads; the coffin is then escorted to the grave, wh line is formed and the same ceremonies are performed as

prescribed. The ceremony at the grave having been com-
ed, the gun squads are marched to the guns and three vol-
are fired; after the last volley a musician sounds taps
the grave.

48. Should the entrance to the cemetery prevent the hearse
mpanying the escort till the latter halts at the grave, the
mn is halted at the entrance long enough to take the coffin
1 the hearse, when the column is again put in march. The
alry and Artillery of the escort, when unable to enter the
osure, turn out of the column and salute the coffin as it
es.

49. In all funeral ceremonies six pallbearers will be selected
'ar as practicable from the grade of the deceased. If the
ased is a commissioned officer, the coffin is borne by six
ommissioned officers; if a noncommissioned officer or pri-
, by six privates.

50. When arms are presented at the funeral of a person en-
d to any of the following honors, the band plays the
cribed national air, or the field music sounds to the stand-
march or flourishes, according to the rank of the deceased,
r which the band plays an appropriate air.
fter the remains are deposited in the grave a salute corre-
ding to the rank of the deceased will be fired, in addition
hree volleys of artillery or of musketry.

51. At the funeral of a mounted officer or enlisted man, his
e, in mourning caparison, follows the hearse.

52. When necessary to escort the remains from the quarters
he deceased to the church before the funeral service, arms
presented upon receiving the remains at the quarters and
as they are borne into the church.

53. Before the funeral the commander of the escort gives
clergyman and pallbearers all needed directions.

CHAPTER VI.—GUARD MOUNTING.

54. At the assembly, the men designated for guard fall in on
r battery parade ground (97), noncommissioned officers in
line of file closers. The first sergeant verifies the detail,

inspects it, replaces any man unfit to go on guard, turns th detail over to the senior noncommissioned officer, and retire The band takes its place on the parade ground so that the le of its front rank shall be 12 paces to the right of the front ra of the guard when the latter is formed.

755. At **adjutant's call**, the adjutant, dismounted, and th sergeant major on his left, march to the parade ground. Th adjutant halts and takes post so as to be 12 paces in front and facing the center of the guard when formed; the sergea major continues on, moves by the left flank, and takes po facing to the left, 12 paces to the left of the front rank of t band; the band plays in quick or double time; each detail marched to the parade ground by its senior noncommissione officer; the detail that arrives first is marched to the line so th upon halting, the breast of the right front-rank man shall near to and opposite the left arm of the sergeant major; t commander of the detail halts it, places himself in front of m facing the sergeant major, at a distance equal to or a lit greater than the front of his detail, and commands: 1. Rig 2. **DRESS.** The detail dresses up to the line of the serge major and its commander, the right front-rank man placing h breast against the left arm of the sergeant major. The det aligned, the commander of the detail commands: **FRONT**, s lutes, and reports: "**The detail is correct**" or "**(So many) se geants, corporals, or privates are absent**"; the sergeant ma returns the salute after the report is made; the command then passes by the right of the guard and takes post in the li of file closers in rear of the right file of his detail.

Should there be more than one detail, it is formed in li manner on the left of the one preceding; the privates, nonco missioned officers and commander of each detail dress on th of the preceding details in the same rank or line; each det commander closes the rear rank to the right and fills bla files, as far as practicable, with the men from his front rank.

Should the guard from a battery not include a noncomm sioned officer, one will be detailed to perform the duties of co mander of the detail. In this case the commander of the d

fter reporting to the sergeant major, passes around the lank between the guard and the band and retires.

. When the last detail has formed, the sergeant major s the detail, takes post two paces to the right and two to the front of the guard, facing to the left, causes the to count off, completes the left squad, if necessary, and if be more than three squads, divides the guard into two ns, again takes post as described above, and commands: n ranks; 2. **MARCH** (152).

sergeant major aligns the ranks and file closers and again post as described above, commands: **FRONT**, moves paral- the front rank until opposite the center, turns to the right, midway to the adjutant, salutes, and reports: "**Sir, the s are correct**"; or, "**Sir (so many), sergeants, corporals, vates are absent**"; the adjutant returns the salute, directs rgeant major: **Take your post, and then draws saber**; the nt major faces about, approaches to within two paces of nter of the front rank, turns to the right, moves three beyond the left of the front rank, turns to the left, halts e line of the front rank and faces about. When the ser- major has reported, the officer of the guard takes post, to the front, six yards in front of the center of the guard raws saber.

adjutant then commands: 1. **Officer (or officers) and non- issioned officers**, 2. **Front and center**, 3. **MARCH.**

the command **center**, the officer carries *saber*. At the and **march**, he advances and halts three paces from the ant, remaining at the carry; the noncommissioned officers by the flanks, along the front, and form in order of rank right to left, three paces in rear of the officer; if there is ficer of the guard the noncommissioned officers halt on a three paces from the adjutant; the adjutant then assigns fficers and noncommissioned officers according to rank, as ws: **Commander of the guard, chief of first platoon, chief ond platoon, and file closers**, or, if the guard is not divided platoons: **Commander of the guard** and **file closers.**

tery to attention, faces to the front, and salutes. The salu acknowledged, the captain carries saber, faces about, command **Prepare for inspection,** and again faces to the front.

The inspection proceeds as before; the captain returns sal and accompanies the inspector as soon as the latter has i spected him.

At inspection of quarters the inspector is accompanied by t captain and followed by the other officers, or by such of th as he may designate; the men, without accouterments, st uncovered near their respective bunks; in camp they stand c ered, without accouterments, in front of their tents; upon t approach of the inspector the first sergeant commands: **ATTE TION,** salutes, if covered, and leads the way through quarters or camp.

SECTION III.—BATTALION INSPECTION.

736. The battalion being in column of batteries, in dou section, on the approach of the inspector the major command **1. Prepare for inspection, 2. MARCH.**

The batteries are prepared for inspection as already p scribed.

The musicians join their batteries. The drum major condu the band, if there be one, to the rear of the column, pass by the right flank, and places it, facing to the front, 36 ya in rear of the battery and opens ranks.

The battalion staff officers place themselves in line, with 1-y intervals, about 40 yards in front of the column, opposite t center, in order of rank, from right to left; the noncomm sioned staff and the noncommissioned officers of the headqu ters detachment form at 1-yard intervals 3 yards in rear of staff officers; the privates are similarly posted 3 yards in r of the noncommissioned officers. The reel cart takes pos prescribed in paragraph **575,** the chest being opened at command **Prepare for inspection, March.** The guard of standard marches to the front and takes post 6 yards in

e band, playing, passes in front of the officer of the guard
e left of the line, and back to its position on the right, when
ases to play.

e adjutant then comes to attention, carries saber, and com-
ls: 1. Guard, 2. ATTENTION, 3. Close ranks, 4. MARCH
).

e adjutant then commands: 1. Present, 2. SABER, faces
rd the new officer of the day, salutes, and reports: Sir, the
l is formed. The new officer of the day, after the adjutant
eported, returns the salute with the hand and directs the
ant: March the guard in review, sir.

e adjutant carries saber, faces about, brings the guard to
saber, and commands: 1. Squads right, 2. MARCH, 3.
ID, 4. HALT.

e guard executes the movement; the band turns to the
and places itself 12 paces in front of the guard.

e adjutant places himself six yards from the flank and
ist of the commander of the guard; the sergeant major,
ards from the left flank of the rear squad.

e adjutant then commands: 1. Pass in review, 2. Forward,
ARCH.

e guard, in column of squads, marches in quick time past
fficer of the day, according to the principles of review, and
ought to eyes right at the proper time by the commander
e guard; the adjutant, commander of the guard, sergeant
r, and drum major salute.

e band, having passed the officer of the day, turns to the
ut of the column, places itself opposite and facing him,
ontinues to play until the guard leaves the parade ground.
field music detaches itself from the band when the latter
out of the column, and remaining in front of the guard,
iences to play when the band ceases.

ving passed 12 paces beyond the officer of the day, the
ant halts; the sergeant major halts abreast of the adjutant
one pace to his left; the adjutant returns saber, they
e, and retire; the commander of the guard then marches
uard to its post.

SECTION IV.—REGIMENTAL INSPECTION.

739. The commands and means are the same as prescribed a battalion.

In column the staff of the colonel forms in line at inter of 1 yard about 30 yards in front of the major of the battalion, the adjutant on the right, the other staff officer order of rank from right to left. The lieutenant colonel the right of the staff. The noncommissioned staff, headqu detachment, guard of the standard, and reel cart form manner similar to that prescribed for battalion inspection. colonel takes post 12 yards in front of the center of his st The inspector inspects the colonel, and, accompanied by latter, inspects the lieutenant colonel and staff officers.

The colonel, lieutenant colonel, and staff, as soon as insp return saber and accompany the inspector.

Commencing at the head of the column, the inspector in the noncommissioned staff, headquarters detachment, gu the standard, each battalion in succession, and the band.

The major of a battalion not undergoing inspection dism his drivers and brings the battalion to rest. On the app of the inspector the major brings his battalion to atte mounts the drivers, and accompanies the inspector throug battalion. The inspection is conducted as in battalion in tion, each captain dismounting his drivers and resting his tery while not undergoing inspection.

When the inspection of a unit is completed the colonel, intimation from the inspector, may direct that it be mar off and dismissed.

The adjutant gives the commands for the inspection of regimental noncommissioned staff, guard of the standard, band.

740. The regiment may be inspected in line. The inspe is conducted according to the same principles as when fo in column. The field, staffs, noncommissioned staffs, and quarters detachments are inspected at their posts in fro the line; the band, which remains at its post on the rig

1. As the new guard approaches the guardhouse, the old
l is formed in line, with its field music three paces to its
; and when the field music at the head of the new guard
es opposite its left, the commander of the new guard com-
s: 1. **Eyes,** 2. **RIGHT;** the commanders of both guards
e. The new guard marches in quick time past the old
l.

e commander of the guard commands: **FRONT,** when the
of the new guard is opposite the field music of the old
l; the commanders of both guards resume carry saber.
e field music having marched three paces beyond the field
: of the old guard, changes direction to the right, and, fol-
l by the guard, changes direction to the left when on a
with the old guard; the changes of direction are without
and. The commander of the guard halts on the line of the
rank of the old guard, allows his guard to march past
and when its rear approaches forms it in line to the left,
paces to the right of the field music of the old guard, and
line with the front rank, and then dresses his guard to the
the field music of the new guard is three paces to the right
front rank.

2. The new guard being in line, the commander of each
l, at his post in front of the center, salutes and carries
.

ould a guard be commanded by a noncommissioned officer,
ands on the right or left of the front rank, according as he
ands the old or new guard, and salutes.

3. The detachments and sentinels of the old guard are re-
l, and as they come in, take their proper place in the
ation; the commander of the old guard then marches it,
the guide right, six yards to the front, then in squad col-
to the right; the field music begins to play, and the guard
hes in quick time past the new guard, the commanders of
guards saluting.

on arriving at the battery parade, the commander of the
uard forms line and dismisses the guard.

The senior lieutenant, the standard bearer, and a serge designated by the commander of the escort dismount in fr of the colonel's quarters, their horses being held by a musici The standard bearer, preceded by the lieutenant and follow by the sergeant, then goes to receive the standard.

The standard bearer comes out, followed by the lieuten and sergeant. They mount and form facing the center of escort, the lieutenant on the right, the sergeant on the left, musician returning to his post. The captain then comma 1. **Present**, 2. **SABER**; the officers of the escort present sa the musicians with the band sounding to the standard, and guidon saluting.

The sabers are brought to the carry; the lieutenant and geant return to their posts; the battery moves to the right fl the band conforming to the movement, the standard be placing himself at the center of the column.

The escort marches with the guide left back to the regim the band playing. The march is so conducted that when escort arrives at 90 yards in front of the right of the regim the direction of the march shall be parallel to its front. W the standard arrives opposite its place in line the escor formed in line to the left and halted. The standard bea passing between the carriages, advances and halts 12 yards front of the colonel.

The standard bearer having halted, the colonel, who posted himself 40 yards in front of the center of his regim faces the line and commands: 1. **Present**, 2. **SABER.** At command officers present saber and the regimental stand and the guidons salute. The colonel faces to the front salutes, the musicians sounding to the standard.

The colonel then faces about and commands: 1. **Carry**, **SABER.** At the second command the carry is resumed. standard bearer moves at a walk toward the regiment, passing by the left of the guard of the standard executes a about and takes his place in the guard.

The escort presents and carries saber with the regiment, the command of the colonel. As soon as the standard

ground on a line with and touching the toe of the left
lance vertical and supported by the left hand; hand at
height of the neck, elbow and forearm closed against the

mounting (240) the lance is held in the left hand with the
on the near side of the lance. After mounting, the lance
asped with the right hand under the left, which lets go of
thout quitting the reins, carried to the right side, lowered,
placed with the ferrule in the stirrup socket. The right
then grasps the lance, forearm nearly horizontal, the arm
igh the sling, lance vertical; this is the position of carry
n, mounted.
mounting with the guidon is executed in a manner the
se of the foregoing.
. Salutes.—Being mounted: Lower the guidon to the front
the lance is horizontal under the right arm.
ing dismounted: Slip the right hand up the lance as high
e eye, then lower the lance to the front by straightening
ight arm to its full extent.
marching the salute is executed when at 6 yards from the
r entitled to the salute, the carry is resumed after passing
ds beyond him.
the halt the salute is executed at each command present
; the carry is resumed at the command carry saber.
en passing in review the reviewing officer is saluted what-
his rank.

SECTION II.—THE STANDARD.

. Whenever in these regulations the term **standard is used**
ludes the national and the regimental standards, and the
ard issued to battalions; if any one of these is referred to,
rm **the national standard, the regimental standard, or the**
e **standard is used.**
. The manual of the standard is as prescribed for the
n except that at carry standard, dismounted, the ferrule
e lance is supported at the right hip.

the grave; the coffin is then carried along the front of t escort to the grave, sabers are presented, and the band p an appropriate air; the coffin having been placed over grave, the music ceases and sabers are brought to the carry.

The commander next commands: 1. Parade, 2. REST.

At the second command the cannoneers execute parade and incline the head.

After the coffin is lowered into the grave and the fu services are completed the commander of the escort comma 1. Battery (or platoon), 2. ATTENTION, and then fires three leys of one round each with blank cartridges. In this case command will be: 1. Fire by battery (platoon, etc.), 2. Bat (platoon, etc.), 3. FIRE. After the last volley a musi sounds taps over the grave.

The escort is then formed into column, marched to the p where it was assembled, and dismissed.

The band does not play until it has left the inclosure.

The funeral ceremony for an enlisted man is the same as an officer, except that the commands Present saber and C saber are omitted; the sergeant in command of the escort sal with the hand on the appearance of the coffin at the quar of the deceased and also when the coffin is carried along front of the escort to the grave.

746. When the distance to the place of interment is co erable, the escort after leaving the camp or garrison may m at ease until it approaches the burial ground, when it is bro to attention. The music does not play while marching at e

In marching at attention the field music may alternate w the band in playing.

747. When it is impracticable for the carriages to appro the grave, they are left outside the inclosure. If the es consists of Artillery only, the officers and mounted men, exc horseholders of horse artillery and drivers, dismount, turn o their horses to the horseholders of horse artillery or the driv

The officers draw saber; the gun squads are next formed column of squads; the coffin is then escorted to the grave, wh line is formed and the same ceremonies are performed as

on with respect to these two batteries. The standard ms in other respects to what is above prescribed.

Section III.—The Saber.

. Officers are armed with the saber, which is worn when ibed in Tables of Occasions, Uniform Regulations.

dismounted duty it is attached to the belt, the scabbard hooked up except when drawing and returning saber.

mounted duty it is attached to the left side of the saddle. not removed when dismounting temporarily for the per- nce of some duty on foot.

. **To draw the saber; the position of carry saber.**—Unhook ber with the thumb and first two fingers of the left hand, on the end of the hook, fingers lifting the upper ring; the scabbard with the left hand at the upper band, bring lt a little forward, seize the grip with the right hand and the saber quickly, raising the arm to its full extent to the front at an angle of about 45° with the horizontal, the edge down, in a straight line with the arm; make a pause and bring the back of the blade against the ler, edge to the front, arm nearly extended, hand by the elbow back, third and fourth fingers back of the grip; at me time hook up the scabbard with the thumb and first ngers of the left hand, thumb through the upper ring, s supporting it; drop the left hand by the side. This is sition of **carry saber dismounted.**

draw saber when mounted, reach with the right hand over idle hand, and without the aid of the bridle hand, draw ber as before. The right hand at the carry rests on the thigh.

. **The position of order saber.**—Being at the carry the of the saber is dropped directly to the front, point on or he ground, edge down, thumb on back of grip. The posi- ay be assumed directly from any other position.

). The saber, if drawn, is held at the carry while mounted. mounted, it is so held while giving commands, or while

marching at attention or changing position in quick time. I cept where otherwise prescribed it is held at the order whil the halt, at attention dismounted.

At the double time, the saber is carried diagonally acros breast, edge to the front, the left hand steadying the scabb

781. Being at order or carry saber: 1. **Present**, 2. **SABER**

At the command **present** raise and carry the saber to front, base of the hilt as high as the chin and 6 inches in f of the neck, edge to the left, point 6 inches farther to the f than the hilt, thumb extended on the left of the grip, all fingers grasping the grip. At the command **saber** lower saber, point in prolongation of the right foot and near ground, edge to the left, hand by the side, thumb on lef grip, arm extended. If mounted, the hand is held behind thigh, point a little to the right and front of the stirrup.

782. Being at present saber: 1. **Carry**, 2. **SABER.**

At the command **saber**, resume the position of carry saber.

783. Being at order saber: 1. **Parade**, 2. **REST.**

Take the position of parade rest (**73**) except that the hand rests on the right, point of saber on or near the grou front of the center of the body, edge to the right.

At the command **attention**, resume the order saber and position of the soldier.

784. To return saber.—Carry the right hand opposite to 6 inches from the left shoulder, saber vertical, edge to the l at the same time unhook and lower the scabbard with the hand and grasp it at the upper band; drop the point to the and pass the blade across and along the left arm; turn the h slightly to the left, fixing the eyes on the opening of the s bard, raise the right hand, insert and return the blade; t the head to the front, drop the right hand by the side, hook the scabbard with the left hand, drop the left hand by the s

When mounted, the saber is returned without using the hand.

SECTION IV.—THE BAND.

785. The band is generally formed in column of fours. may be formed in two or more ranks.

mounted, the band is formed in two or more ranks, with
ient intervals between the men and distances between the
s to permit a free use of the instruments.
e drum major is 3 yards in front of the center of the front
He gives the commands or signals for its movements.
ommands are the same as for a squad, substituting in them
for squad.
line the band is posted with the left of its front rank 36
s to the right of the right battery. In column it marches
its rear rank 36 yards in front of the leading battery or
ont rank 36 yards in rear of the rear battery, according as
olumn has been formed to the right or the left.
smounted, the band takes post as when mounted.
ien united, the musicians form in rear of the band. When
and is not present, the posts, movements, and duties of the
cians are the same as prescribed for the band.
rendering honors, whenever the regimental standard
es, the band plays the prescribed national air, or the field
c sounds to the standard, march or flourishes, at a signal
the drum major.
marching, the different ranks dress to the right.
hen the command with which the band is posted faces to
rear, the band executes the countermarch. The intervals
increased before executing a countermarch and closed upon
completion of the countermarch.
executing the countermarch, the men in the leading rank
ie right of the drum major turn individually to the right
it and those to his left to the left about, each followed by
men covering him in the column. The drum major passes
ugh the center.
dismounted formations, when right, left, or about face is
uted, the band faces in the same manner.

Signals of the Drum Major.

86. The signals for the movements of the band will corre-
ld to the arm signals (**504–506**) as far as practicable.
repare to play: The signal for attention.

Play: The signal of execution.

Prepare to cease playing: Same as **prepare to play.**

Cease playing: Same as **play.**

The march or flourishes.—1. **Prepare to play:** Raise the ... arm to the height of the forehead and hold in a horizontal p... tion, hand to the left.

2. **Play.** Lower the hand quickly.

Increase intervals: Extend the arm to the front and mo... several times to the right and left in front of the body.

To Inspect the Band.

787. Being at the halt: 1. **Open ranks,** 2. **MARCH,** 3. **FR...**

The front rank dresses to the right; the other ranks ... backward, each taking the distance of 3 yards from the ... preceding, halt, and dress to the right.

Prepare for Inspection.

Each musician as the inspector approaches him raises his ... strument in front of his body, reverses it so as to show the o... side, and then returns it to its former position.

A bugler, when inspected, executes with his bugle what ... prescribed for a band musician.

1. **Close ranks,** 2. **MARCH.**

The front rank stands fast; the other ranks move up ... close to the proper distance.

Section V.—Honors.

788. The President and the Vice President will be recei... with regimental standards or colors drooping, officers and tro... saluting, and the bands playing The Star Spangled Banner, or ... the absence of the band, the field music or bugles sounding to ... standard. Officers of the following grades of rank will be ... ceived with regimental standards or colors drooping, offic... and troops saluting and the bands and field music playing ... follows: A general, the General's March; a lieutenant gene...

pets sounding 3 flourishes or drums beating 3 ruffles; a r general, 2 flourishes or 2 ruffles; a brigadier general, 1 ish or 1 ruffle.

9. To the members of the Cabinet, the Chief Justice, the ident pro tempore of the Senate, the Speaker of the House epresentatives, American or foreign ambassadors, and gov- rs within their respective States and Territories the same rs are paid as to a general, except that a foreign ambas- r will be received with the national air of his country, and the number of guns fired as personal salutes will be as :ribed in paragraph 820; to the Assistant Secretary of and to American and foreign envoys or ministers the same rs as to a lieutenant general; to officers of the Navy the rs due to their relative ranks; to officers of the marines, nteers and militia when in the service of the United States, honors due to like grades in the regular service; to officers foreign service the honors due to their rank.

0. The national or regimental color or standard, uncased, ing a guard or other armed body will be saluted, the field ic sounding to the standard. Officers or enlisted men pass- he uncased color will render the prescribed salute; with no s in hand, the salute will be the hand salute, the headdress to be removed.

1. Whenever The Star Spangled Banner is played at a tary station, or at any place where persons belonging to the tary service are present in their official capacity or present ficially but in uniform, all officers and enlisted men present stand at attention, facing toward the music, retaining their tion until the last note of the air, and then salute. With rms in hand the salute will be the hand salute. The same ect will be observed toward the national air of any other ntry, when it is played as a compliment to official repre- atives of such country. When played under the circum- ces contemplated by this paragraph, The Star Spangled ner will be played through without repetition of any part is not required to be repeated to make the air complete.

792. When the flag is lowered at retreat and aboard trans when the flag is hoisted at guard mounting, part of the c mony is the playing of The Star Spangled Banner, or To Standard when there is no band, and another part is the sa to the flag. All officers and enlisted men out of ranks stand attention facing the flag while the air is being played, and the last note of the music salute in the prescribed manner.

793. No honors are paid by troops when on the march or trenches, except that they may be called to attention, and salute is rendered by troops marching in double time or at trot or gallop.

794. When armed bodies of troops, or unarmed bodies c manded by commissioned officers, pass each other, except dur drills or exercises, they are called to attention, if not alre at attention, and the commanders salute, the junior rende the first salute.

795. Before saluting an armed body, troops are alw brought to attention.

796. No salutes are rendered between unarmed bodies c manded by noncommissioned officers.

797. If an officer passes a body of troops, except at drills exercises, compliments are paid as follows:

If the officer is a superior officer of the commander of t troops, the troops are called to attention, if not already attention, the commander salutes and the officer returns t salute. If the officer is not a superior officer of the comman of the troops, salutes are exchanged, the junior saluting fi and the troops are not called to attention.

798. If an officer or body of troops entitled to salute pas in rear of troops at a halt, the troops are brought to attenti but no salutes are rendered.

799. The commander of a body of troops, if a commissio officer, is saluted by all officers junior in rank and by all e listed men. The salute is returned by the commander only, w does not call his command to attention if it be not at attenti

800. Uncovering is not a form of the prescribed salute, a the hand salute is executed only when covered.

1. When making or receiving official reports, all officers salute, if covered; if uncovered, they stand at attention. ıen under arms, the salute is made with the saber if n (78), otherwise with the hand.

meeting, all officers salute when covered; when uncovered, exchange the courtesies observed between gentlemen. Mili- courtesy requires the junior to salute first, but when the e is introductory to a report made at a military ceremony rmation, to the representative of a common superior—as, xample, to the adjutant, officer of the day, etc.—the officer ng the report, whatever his rank, will salute first; the r to whom the report is made will acknowledge by saluting, vered, or verbally if uncovered, that he has received and rstood the report.

2. On official occasions officers, when indoors and under , do not uncover, but salute with the saber if drawn; wise with the hand. If not under arms, they uncover and l at attention, but do not salute.

3. An enlisted man not in ranks, whether in uniform or if covered, salutes with the hand (78) all officers when n saluting distance. Officers are saluted whether in uni- or not.

4. A noncommissioned officer or private in command of tachment salutes with the hand, after calling the detach- to attention.

5. An enlisted man, if seated, rises on the approach of an r, faces toward him, and if covered, salutes. If standing, ces the officer for the same purpose. If the parties remain ıe same place or on the same ground, such compliments not be repeated. Soldiers actually at work do not cease to salute an officer unless addressed by him; if addressed, stand at attention, and if covered, salute.

6. Before addressing an officer, an enlisted man makes ıescribed salute with the weapon with which he is armed, unarmed and covered, with the hand. He also makes the salute after receiving a reply. If uncovered, he stands tention without saluting.

A mounted man dismounts before addressing an officer n mounted, except in the field under campaign or simulated ca paign conditions.

807. All salutes in passing or approaching are begun fi by the junior at 6 paces distance, or at 6 paces from the near point of passing; no salutes, except as otherwise prescrib are made at greater distances than 30 paces.

808. Indoors, except as provided in paragraph **809**, an u armed enlisted man uncovers and stands at attention upon t approach of an officer; he does not salute. If armed, he salu as heretofore prescribed without uncovering. Outdoors, if c ered, he salutes.

809. On all occasions outdoors, and also in public plac such as stores, theaters, railway and steamboat stations, a the like, the salute to any person whatever by officers and listed men in uniform, with no arms in hand, whether on or duty, shall be the hand salute, the headdress not to be remov

810. When an officer enters a room where there are soldi the word **attention** is given by some one who perceives hi when all rise and remain standing in the position of the soldi until the officer leaves the room or signifies his wishes. T same rule applies when an officer junior to the one entering also in the room. Soldiers at meals do not rise.

811. When an officer approaches a number of enlisted m out of doors and not in ranks the word **attention** is given some one who perceives him, when all stand at attention and salute.

812. Officers at all times acknowledge the courtesies of juni officers and enlisted men by returning their salutes in the ma ner prescribed in these regulations. When several officers company are saluted, all return the salute.

813. Soldiers at all times and in all situations pay the sal compliments to officers of the Army, Navy, Marine Corps, a Volunteers and to officers of the Organized Militia in uniform to officers of their own regiment, corps, or arm of service.

814. Officers arriving at the headquarters of a military co mand, or at a military post, call upon the commander there

n as practicable and register their names. If the visiting be senior to the commander, the former may send a card, ich case it becomes the duty of the commander to make st call.

. Honors, courtesies, and ceremonies not referred to are found in Army Regulations and in the Manual of or Guard Duty.

SECTION VI.—SALUTES WITH CANNON.

. Salutes with cannon will, whenever practicable, be fired battery under command of its own officers.

interval between discharges will be not less than 5 sec- The battery commander will give the command for firing piece. Immediately after each piece is discharged it is led and made ready to fire again.

7. Pieces of field artillery will not be used to fire the ing or evening gun.

8. Salutes will not be fired between sunset and sunrise, not on Sunday unless required by international courtesy. general rule, salutes will be fired between 8 a. m. and t. The national flag will always be displayed at the time ing a salute.

National Salutes.

9. The national salute is 21 guns. It is also the salute to tional flag. The salute to the Union, commemorative of the aration of Independence and consisting of one gun for State, is fired at noon on July 4 at every post provided suitable artillery.

Personal Salutes.

20. The President, both on his arrival at and departure a military post, or when in its vicinity, receives a salute 1 guns. No other personal salute is fired in his presence. he sovereign or chief magistrate of a foreign country re- es the salute prescribed for the President. Members of a al family receive the salute due their sovereigns. No salute

to a personage of lesser degree shall be fired in their of presence.

An ex-President of the United States receives a salute of guns.

The Vice President receives a salute of 19 guns.

When officials other than those named visit military po they receive salutes as follows:

	G
Ambassadors, members of the Cabinet, and the President pro tempore of the Senate	
The Chief Justice, the Speaker of the House of Representatives, a committee of Congress officially visiting a military post, governors within their respective States or Territories, or a governor general, and the civil governor of the Philippine Islands	
The Assistant Secretary of War or the Assistant Secretary of the Navy, when officially visiting a military post; the vice governor of the Philippine Islands, and American or foreign envoys or ministers	
Ministers resident accredited to the United States	
Chargés d'affaires	
Consuls general accredited to the United States	
The General	
The Lieutenant General	
Major general	
Brigadier general	

The term "governor general" shall be taken to mean an ministrative officer under whom officers with the title of g ernor are acting.

821. As a rule, a personal salute is to be fired when the p sonage entitled to it enters a post.

When several persons, each of whom is entitled to a salu arrive together at a post, the highest in rank or position alo is saluted. If they arrive successively, each is saluted in ru

An officer assigned to duty according to his brevet rank entitled to the salute prescribed for the grade to which he assigned.

A retired general officer making an official visit is salut according to his rank.

An officer, whether civil, military, or naval, holding two more positions, either of which entitles him to a salute,

only the salute due to the highest grade. In no event is
ıme person to be saluted in more than one capacity.
sonal salutes at the same place and in compliment to the
person, whether civil, diplomatic, military, or naval, are
to be fired oftener than once a year, unless such person
have been in the meantime advanced in rank.

2. Officers of the Navy are saluted according to their rela-
rank; officers of marines and of the volunteer forces or
a in the service of the United States, and officers of for-
services, are saluted according to rank.

3. When a civil functionary entitled to a salute arrives at
itary post, the commanding officer meets or calls upon him
on as practicable, and will tender him a review if the gar-
consists of not less than four companies. When a general
r visits a post within his command, the troops will be
led for review, unless he directs otherwise. When a salute
be given an officer junior to another present at a post, the
r will be notified to that effect by the commanding officer.

4. In addition to the foregoing, occasions of a public
re frequently arise when salutes are both desirable and
er. Orders will be given in such cases.

5. Detailed rules for assembling blank ammunition are
ı in the Handbook of the Matériel and must be strictly
rved.

6. In case of failure of the cartridge to fire when the trig-
is pulled the breech will not be opened until after the
ration of at least one minute.

PART VIII.—BUGLE CALLS.

Warning Calls.

827. **First call, guard mounting, full dress, overcoats, d stable, water, and boots and saddles** precede the assembly such interval as may be prescribed by the commanding offi

Mess, church, and **fatigue,** classed as **service calls,** may als used as warning calls.

First call is the first signal for formation for roll call on

Guard mounting is the first signal for guard mounting.

Drill call is the first signal for drill dismounted.

Boots and saddles is the signal for mounted formations; mounted drill, it immediately follows the signal **drill.**

The musicians assemble at **first call, guard mounting, boots and saddles.**

When full dress or overcoats are to be worn, the full d or overcoat call immediately follows **first call, guard mount or boots and saddles.**

Formation Calls.

828. **Assembly.**—The signal for the batteries or details form on their battery parade grounds.

When the drivers are near their horses, and the men known to be present, the **assembly** may be omitted after b and saddles, at the discretion of the commanding officer, which case the drivers immediately proceed to their horses harness without further command; the cannoneers proceed their carriages.

Adjutant's call.—The signal for the batteries or guard det to assemble on the camp or garrison parade ground; it foll the **assembly** at such interval as may be prescribed by commanding officer.

the standard.—The signal for the battalions to form regi-
It is also used when the standard salutes.

Alarm Calls.

. Fire call.—The signal for the men to fall in, without
to extinguish fire.
arms or to horse.—The signal for the batteries to form at
gnated place, harnessed and hitched, as quickly as possible.

Service Calls.

. Taps, mess, sick, church, recall, issue, officers', captains',
ergeants', fatigue, school, and the general.
general is the signal for striking tents and leading
is preparatory to marching.
eille precedes the assembly for roll call; retreat follows
sembly, the interval between being only that required for
tion and roll call.
s is the signal for extinguishing lights; it is usually pre-
by call to quarters by such interval as is prescribed in
Regulations.
mbly, reveille, retreat, adjutant's call, to the standard,
urishes, and the marches are sounded by all the musicians
; the other calls, as a rule, are sounded by the musician
guard or orderly musician; he may also sound the as-
when the musicians are not united.
morning gun is fired at the first note of reveille, or, if
es be played before reveille, it is fired at the commence-
of the first march.
evening gun is fired at the last note of retreat.

Drill Signals.

. The drill signals include both the preparatory com-
and the commands of execution; the last note is the
and of execution.

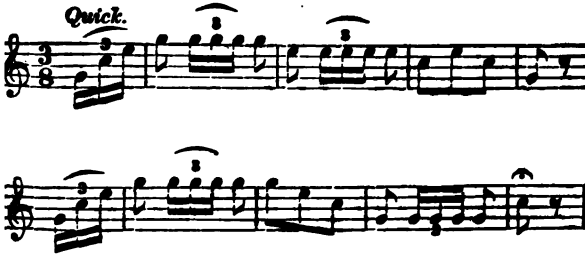
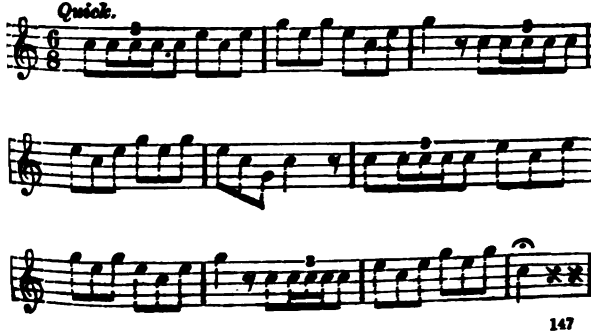
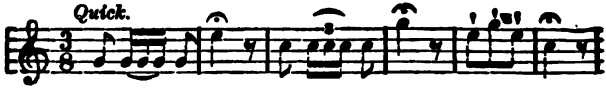
The drill signals are taught in succession, a few at a t until the officers and men are thoroughly familiar with t some drills being specially devoted to this purpose.

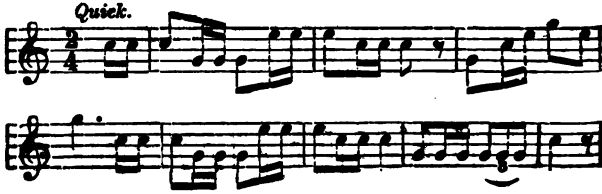
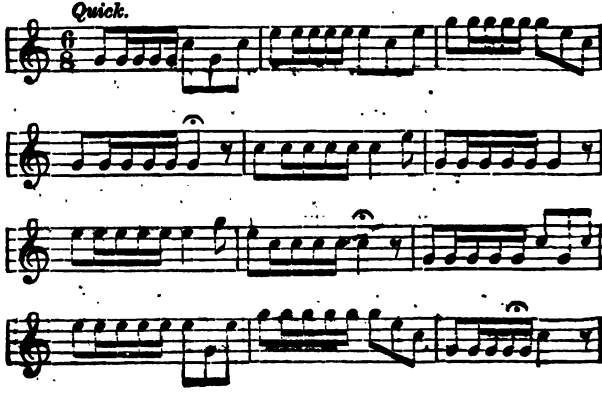
The memorizing of these signals will be facilitated by ob ing that signals for all movements to the right are on ascending scale; that signals for the corresponding movem to the left are corresponding signals on the descending sc that the changes of gait are all upon the same note; that tains' call is the first two bars of officers' call with the atte added.

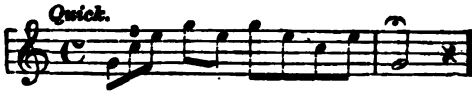
832. In the presence of the enemy all bugle calls are hibited.

BUGLE CALLS.

economize space, the music is written an octavo higher than the trumpet scale, and is adjusted to the scale of the bugle.

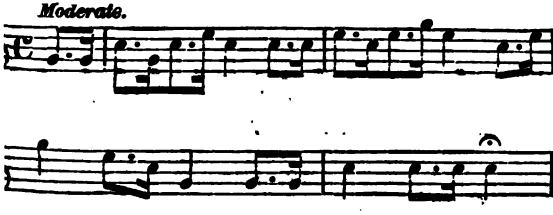
1. First Call.

2. Guard Mounting.

3. FULL DRESS.

4. OVERCOATS.

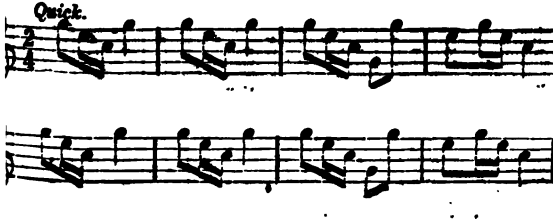
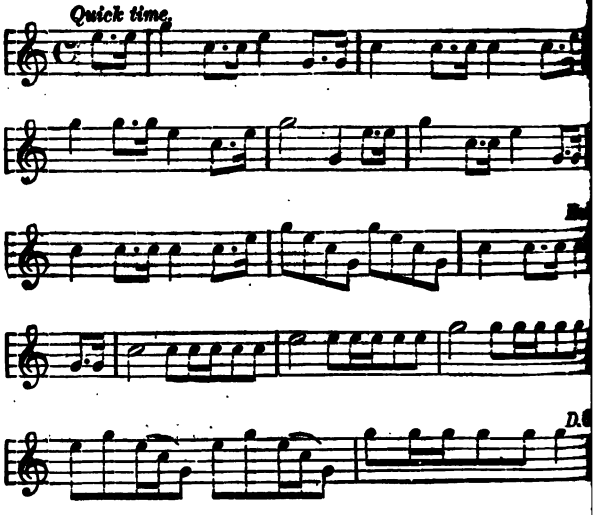
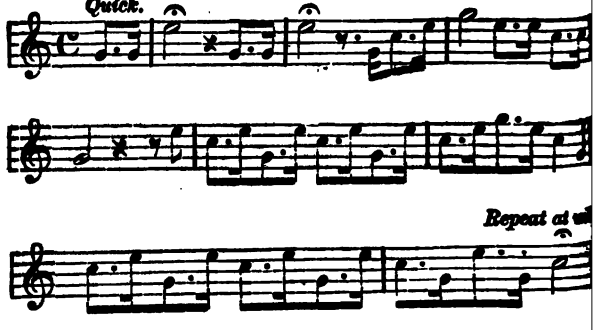
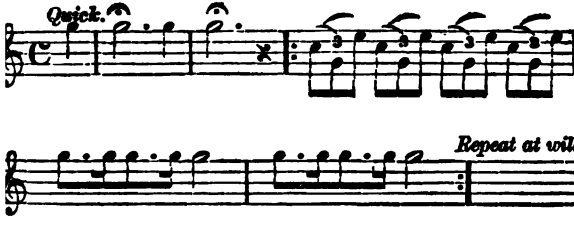
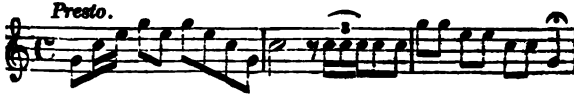
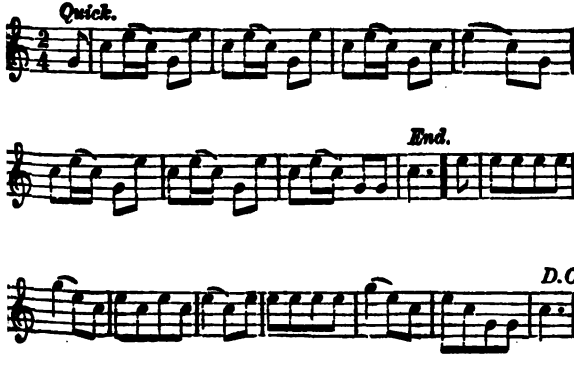
5. DRILL.

6. STABLE.

7. WATER.



8. BOOTS AND SADDLES

9. ASSEMBLY.



10. ADJUTANT'S CALL.

11. TO THE STANDARD, OR TO THE COLOR.

12. FIRE.

13. To Arms.

14. To Horse.

15. Reveille.

to a personage of lesser degree shall be fired in their of presence.

An ex-President of the United States receives a salute of guns.

The Vice President receives a salute of 19 guns.

When officials other than those named visit military p they receive salutes as follows:

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Ambassadors, members of the Cabinet, and the President pro tempore of the Senate	
The Chief Justice, the Speaker of the House of Representatives, a committee of Congress officially visiting a military post, governors within their respective States or Territories, or a governor general, and the civil governor of the Philippine Islands	
The Assistant Secretary of War or the Assistant Secretary of the Navy, when officially visiting a military post; the vice governor of the Philippine Islands, and American or foreign envoys or ministers	
Ministers resident accredited to the United States	
Chargés d'affaires	
Consuls general accredited to the United States	
The General	
The Lieutenant General	
Major general	
Brigadier general	

The term "governor general" shall be taken to mean an ministrative officer under whom officers with the title of g ernor are acting.

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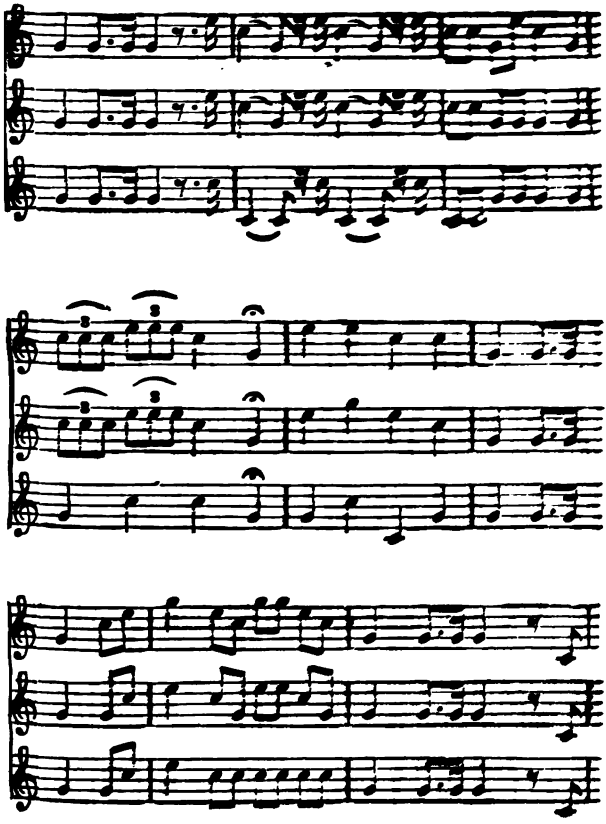
TATTOO—*Continued.*

PART VIII.—BUGLE CALLS.

Warning Calls.

827. **First call, guard mounting, full dress, overcoats, stable, water,** and **boots and saddles** precede the **assembly** such interval as may be prescribed by the commanding of

Mess, church, and **fatigue,** classed as **service calls,** may als used as warning calls.

First call is the first signal for formation for roll call on

Guard mounting is the first signal for guard mounting.

Drill call is the first signal for drill dismounted.

Boots and saddles is the signal for mounted formations; mounted drill, it immediately follows the signal **drill.**

The musicians assemble at **first call, guard mounting, boots and saddles.**

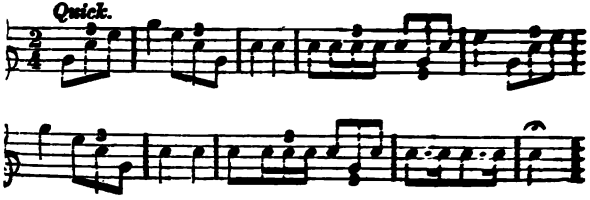
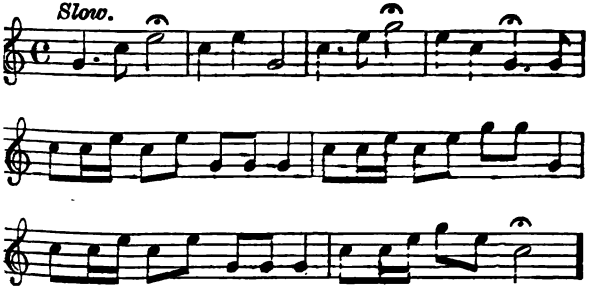
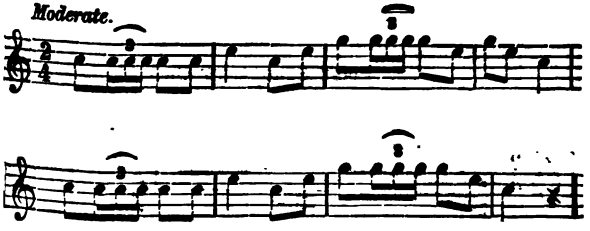
When full dress or overcoats are to be worn, the full or overcoat call immediately follows **first call, guard mou** or **boots and saddles.**

Formation Calls.

828. **Assembly.**—The signal for the batteries or detail form on their battery parade grounds.

When the drivers are near their horses, and the men known to be present, the **assembly** may be omitted after and saddles, at the discretion of the commanding officer, which case the drivers immediately proceed to their horses harness without further command; the cannoneers proceed their carriages.

Adjutant's call.—The signal for the batteries or guard det to assemble on the camp or garrison parade ground; it foll the **assembly** at such interval as may be prescribed by commanding officer.

20. SICK.

21. CHURCH CALL.

22. RECALL.

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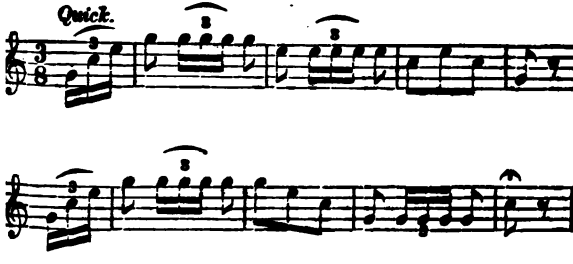
832. In the presence of the enemy all bugle calls are
hibited.

BUGLE CALLS.

economize space, the music is written an octavo higher than the trumpet scale, and is adjusted to the scale of the bugle.

1. First Call.

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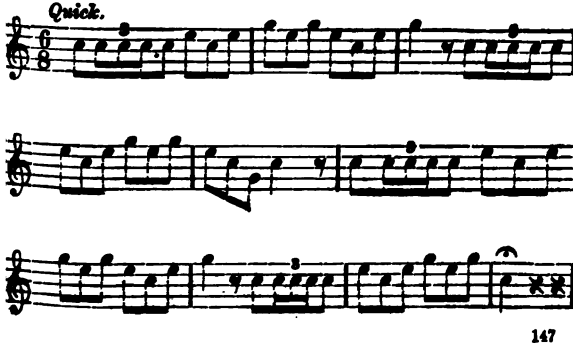
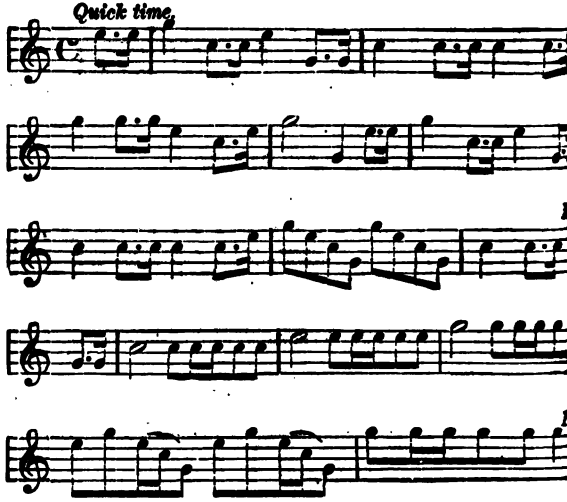

11. TO THE STANDARD, OR TO THE COLOR.

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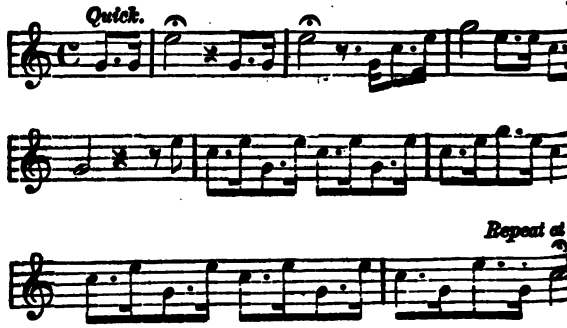
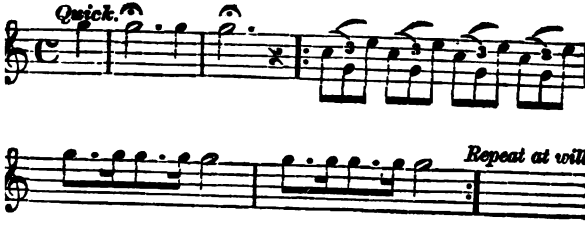

13. To Arms.

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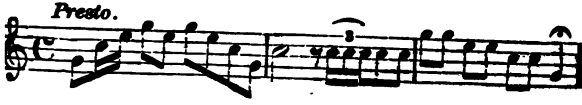
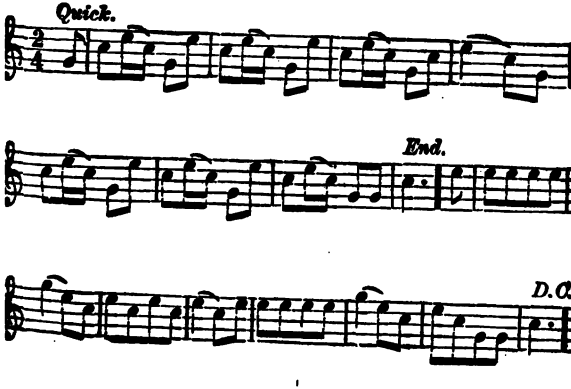

15. Reveille.

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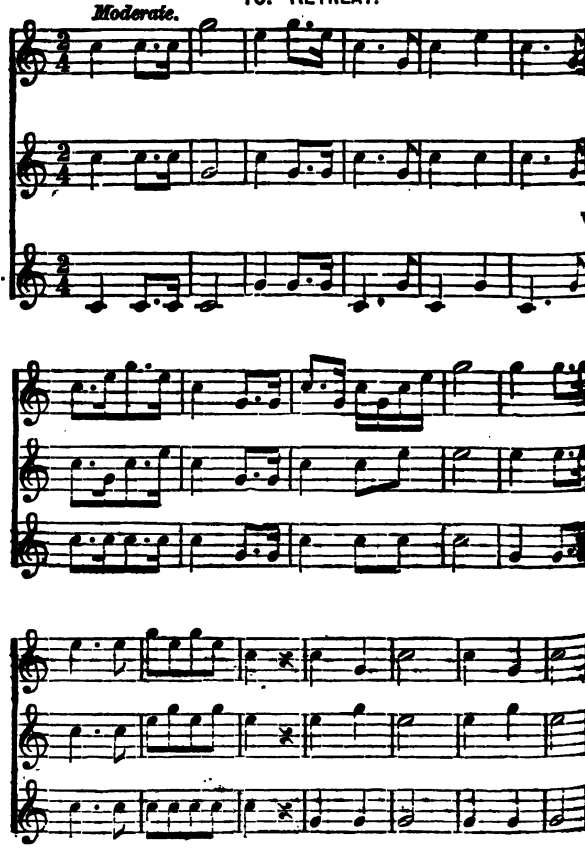
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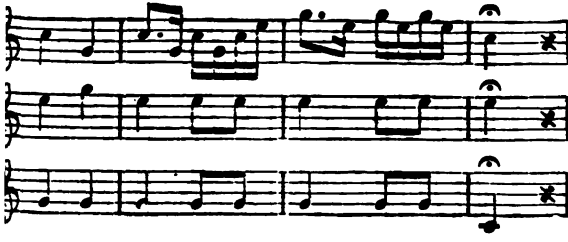
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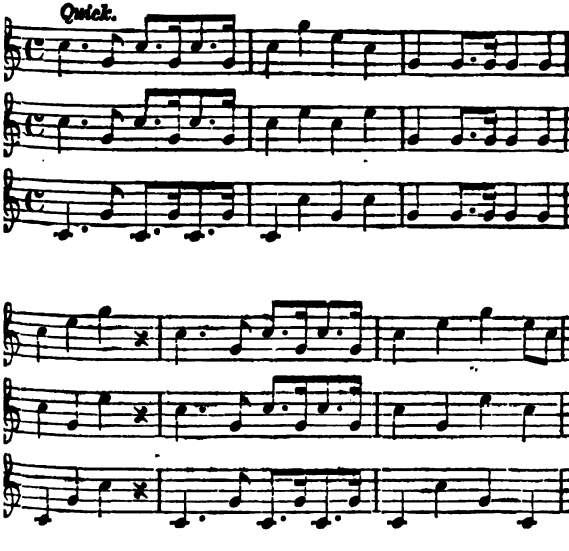
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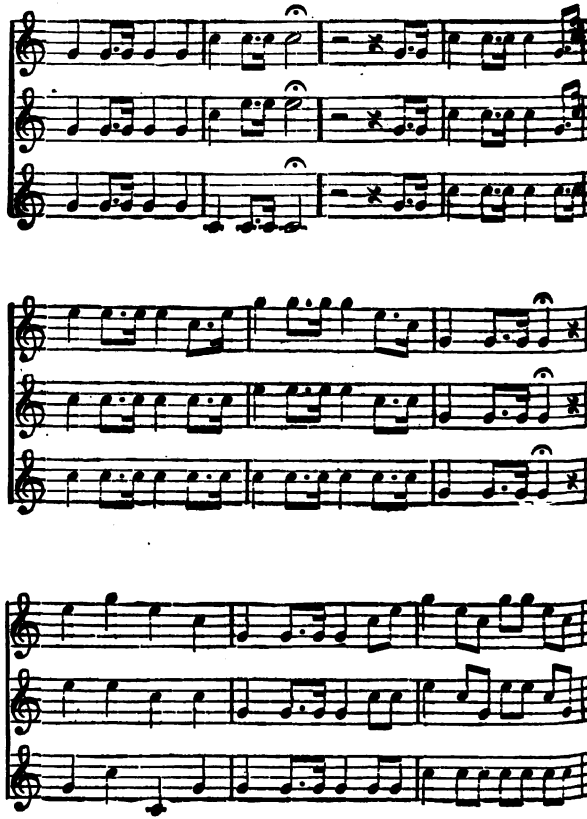
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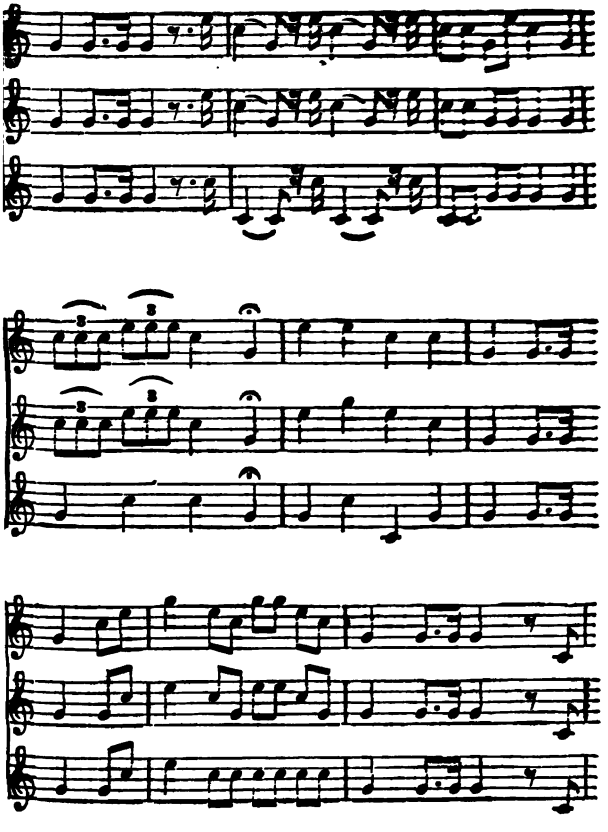
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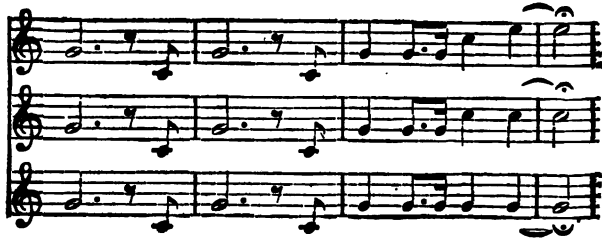
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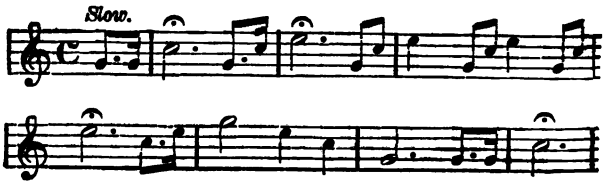
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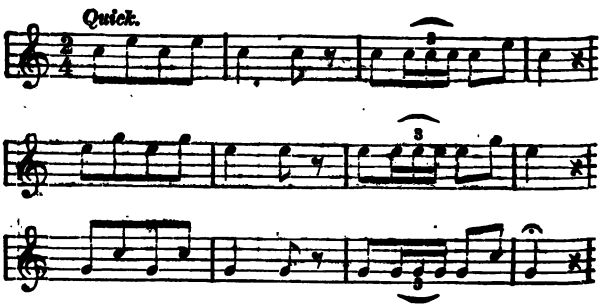
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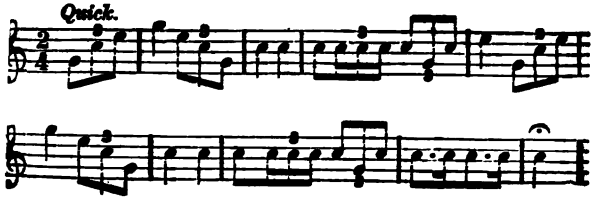
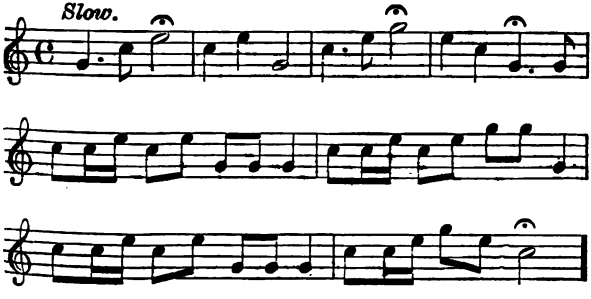

21. CHURCH CALL.

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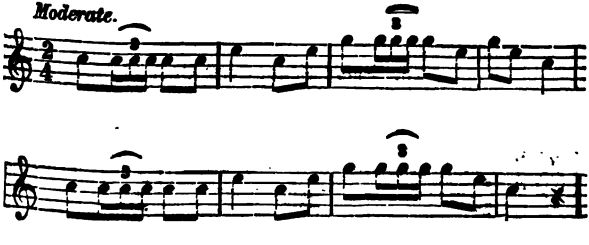
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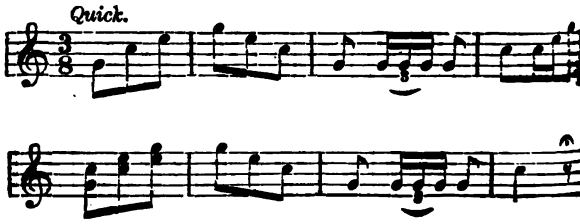
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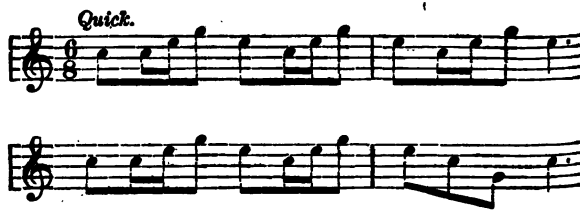
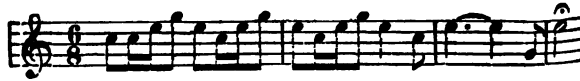

25. CAPTAINS' CALL.

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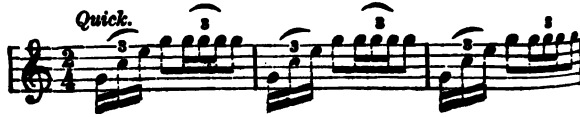
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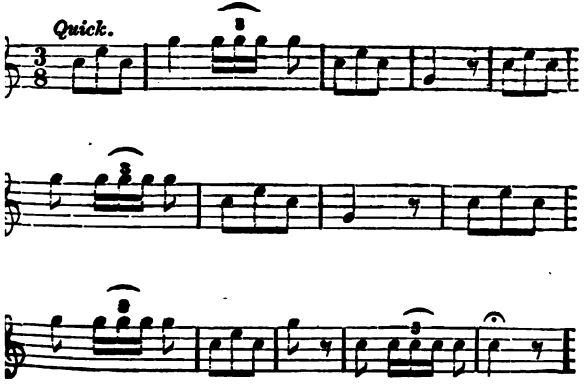
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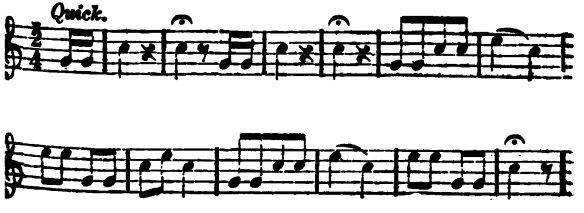
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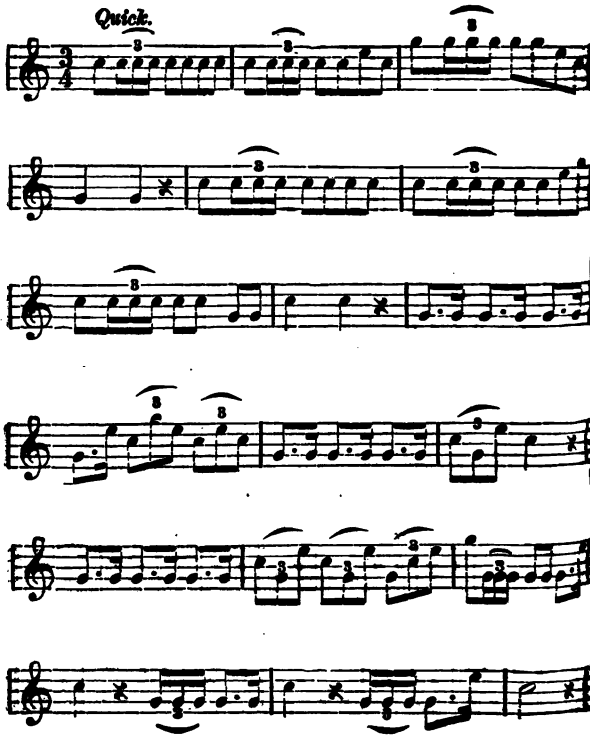
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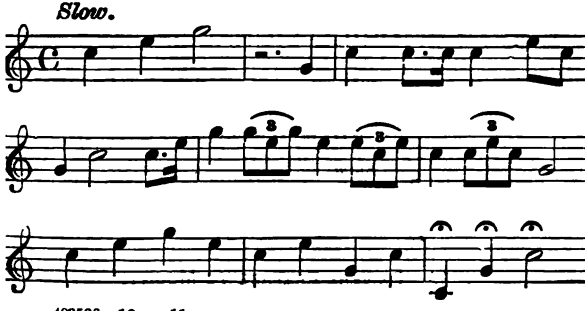
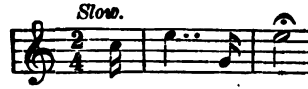
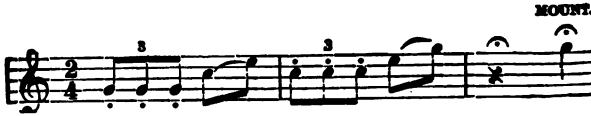
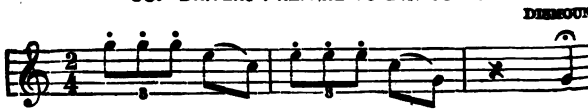
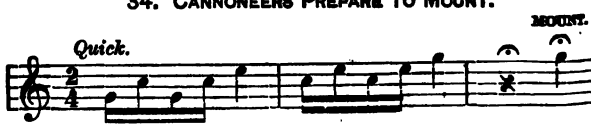

DRILL SIGNALS.

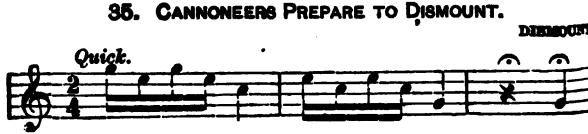
31. Attention.



32. Drivers Prepare to Mount.

33. Drivers Prepare to Dismount.



34. Cannoneers Prepare to Mount.

35. Cannoneers Prepare to Dismount.



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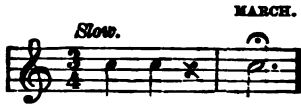
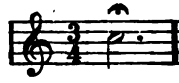


37. HALT.



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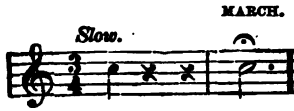

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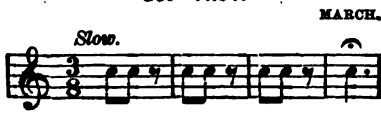

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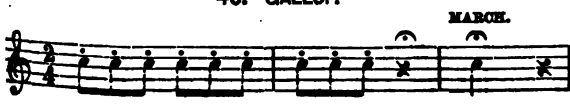

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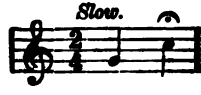
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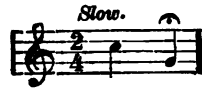
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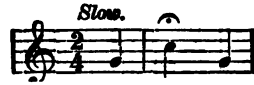
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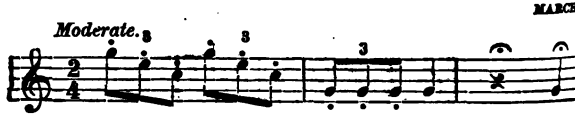
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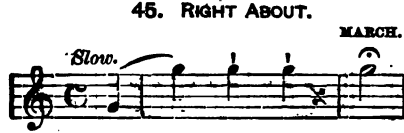
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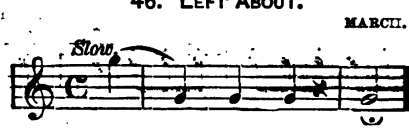
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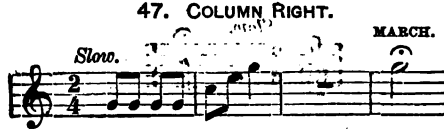
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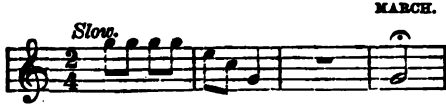
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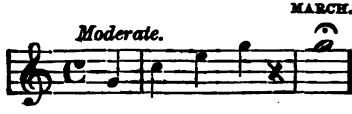
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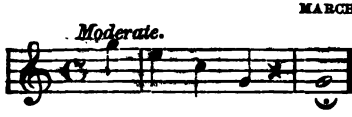

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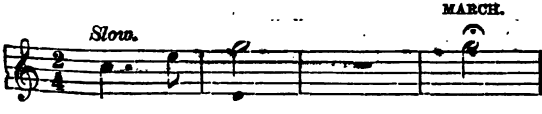

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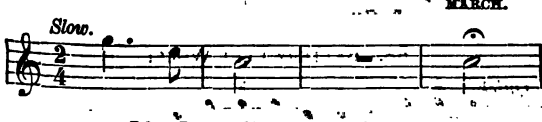
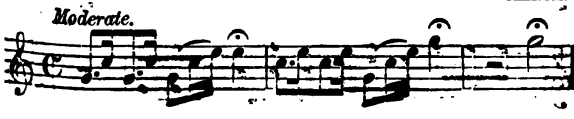


53. RIGHT FRONT INTO LINE.

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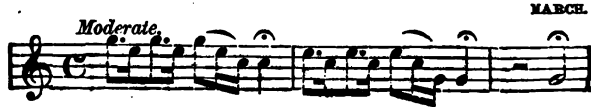
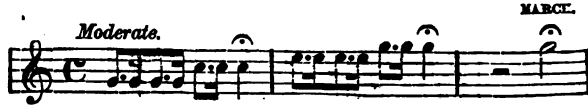
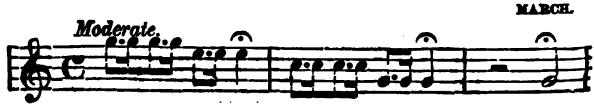

55. ON RIGHT INTO LINE.

56. ON LEFT INTO LINE.



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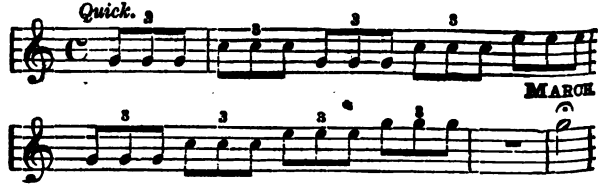
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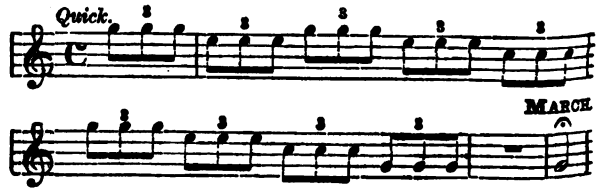
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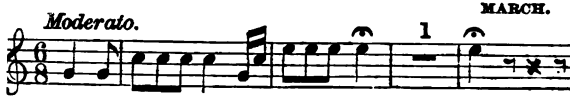
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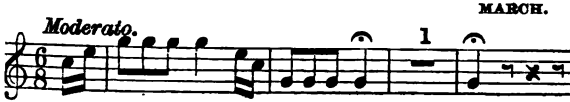
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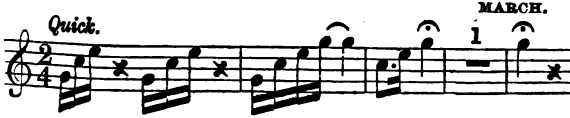
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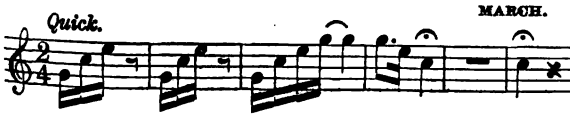
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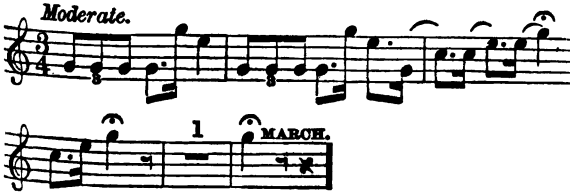
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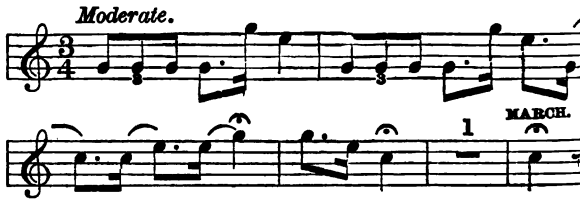
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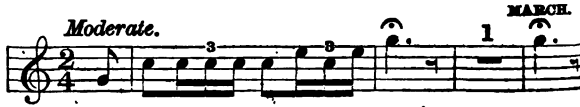
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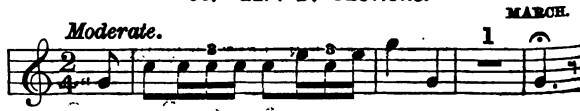

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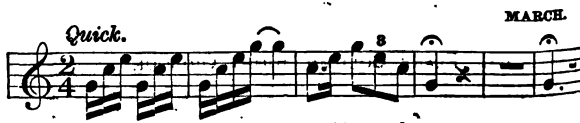
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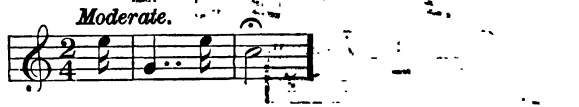
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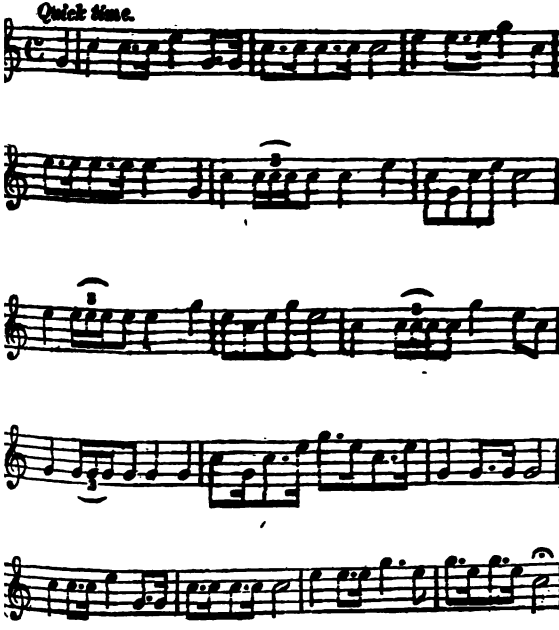
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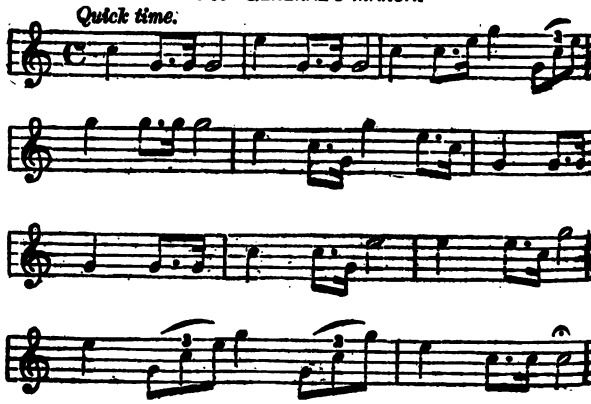

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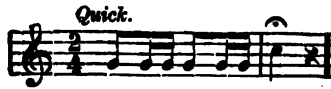
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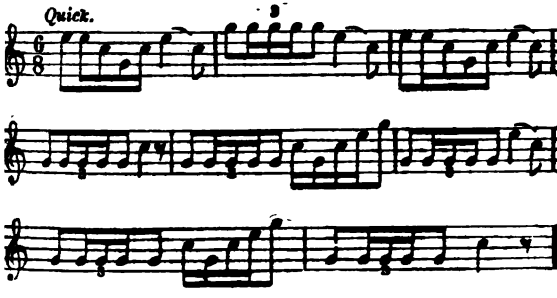
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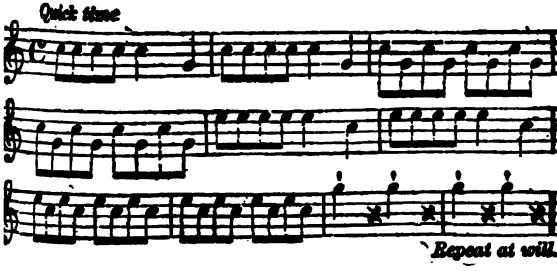
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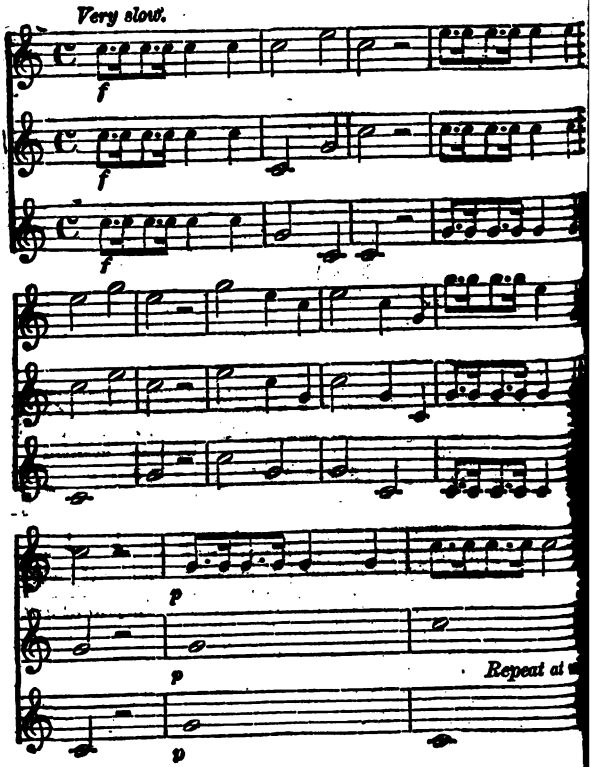
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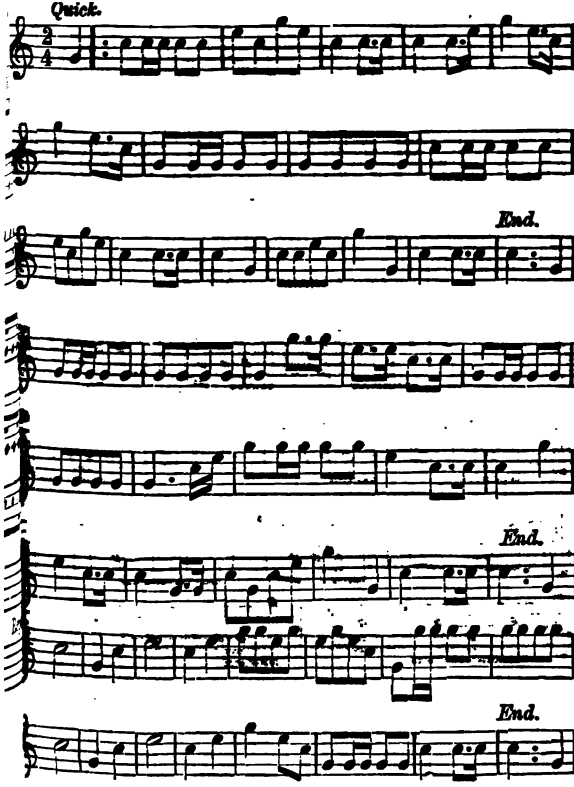
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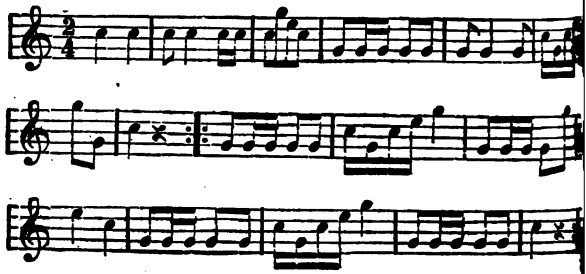
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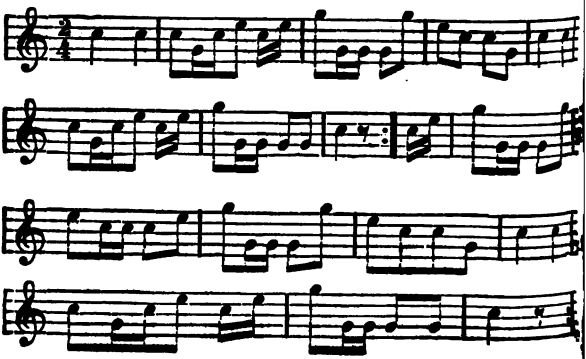
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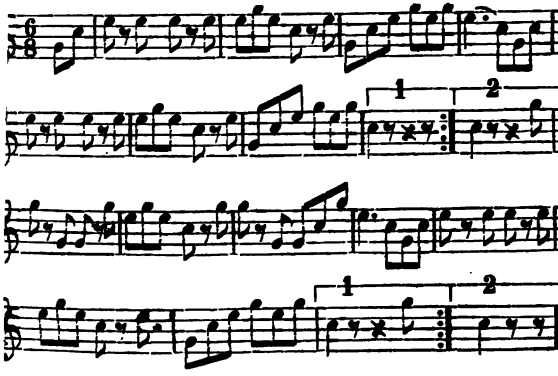
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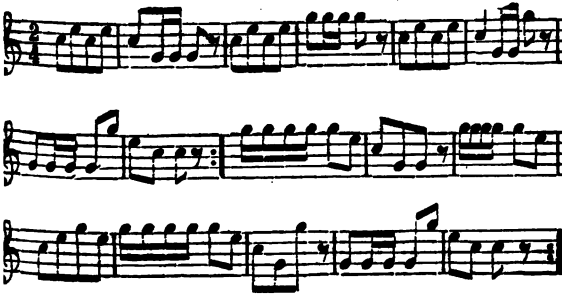
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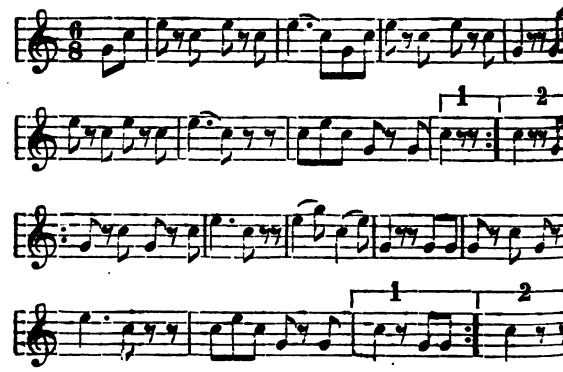
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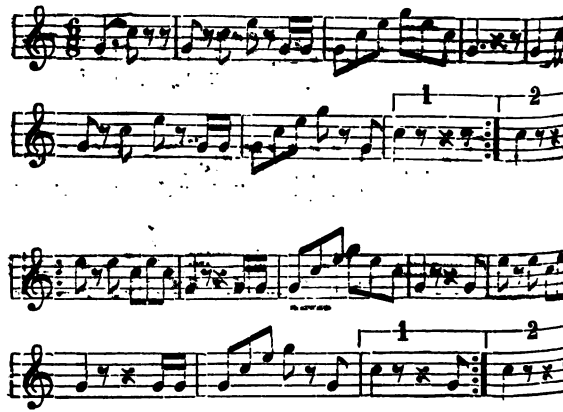
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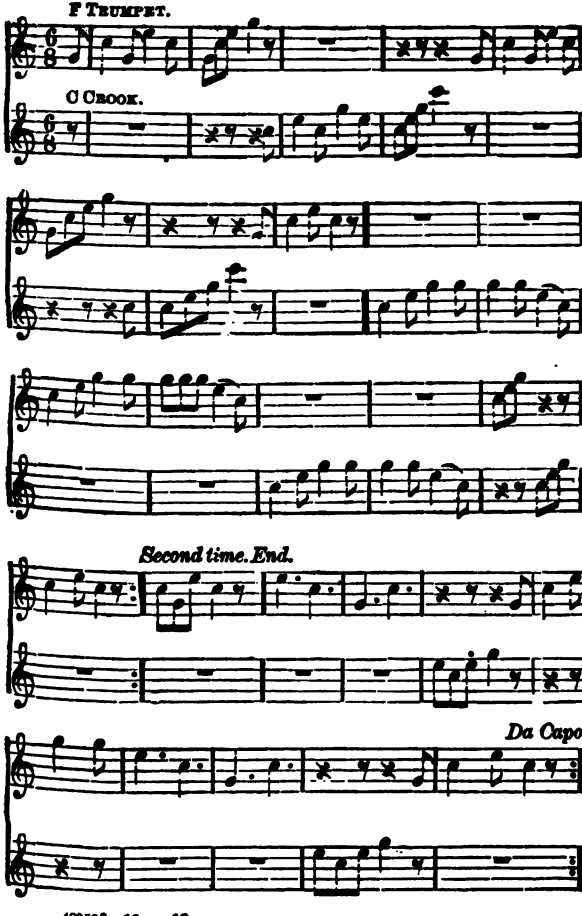
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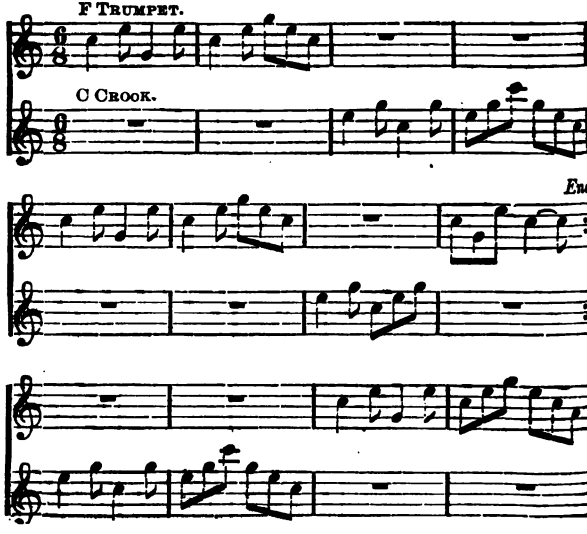
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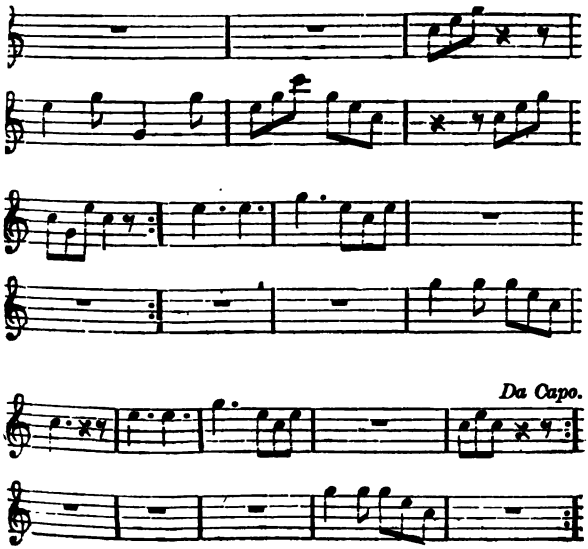
Prof. Harvey N. Davis,
Cambridge.

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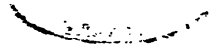

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, D. C., April 19, 1916.

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y order of the Secretary of War.

H. L. SCOTT,
Major General, Chief of Staff.

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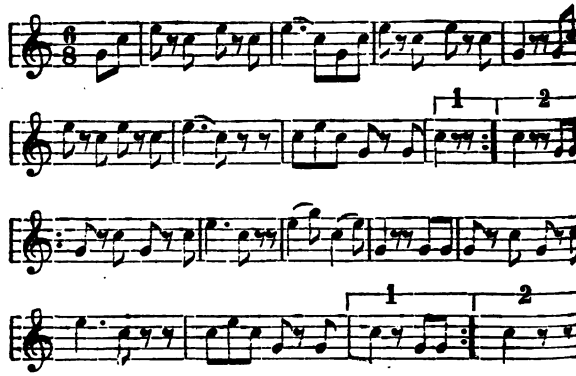
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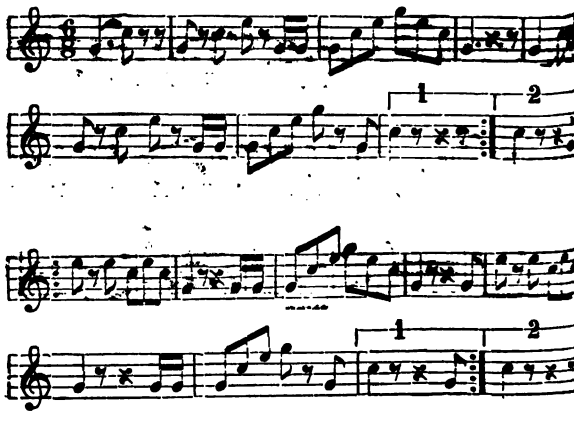
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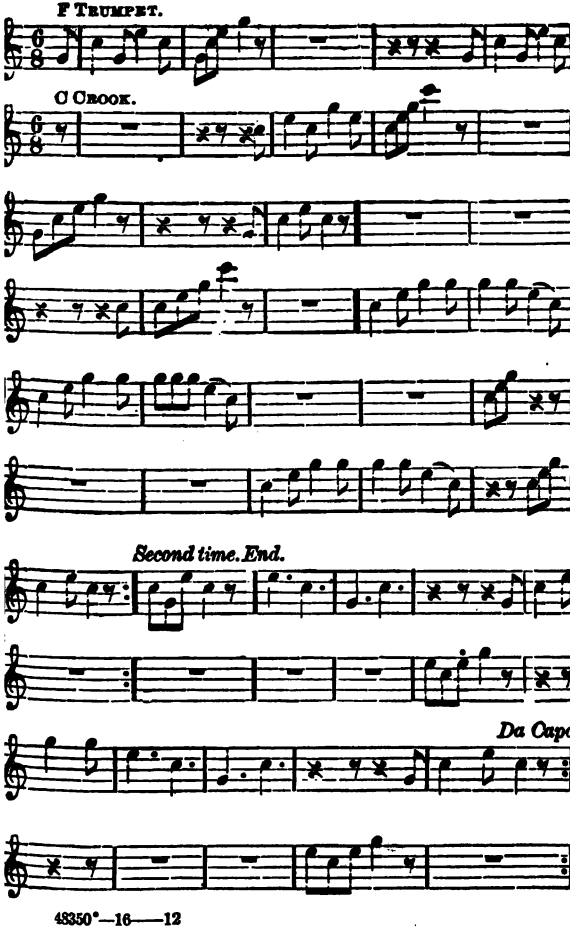
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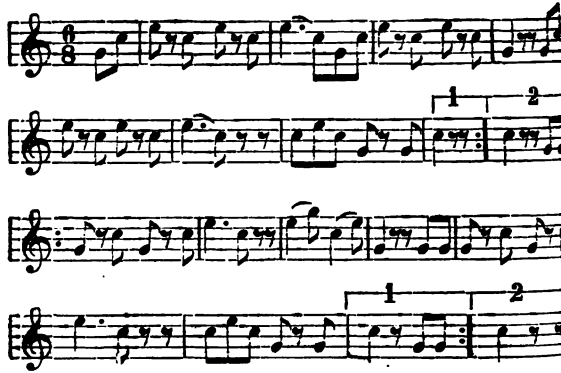
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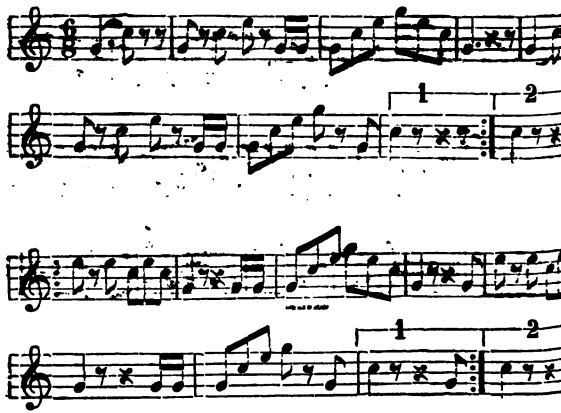
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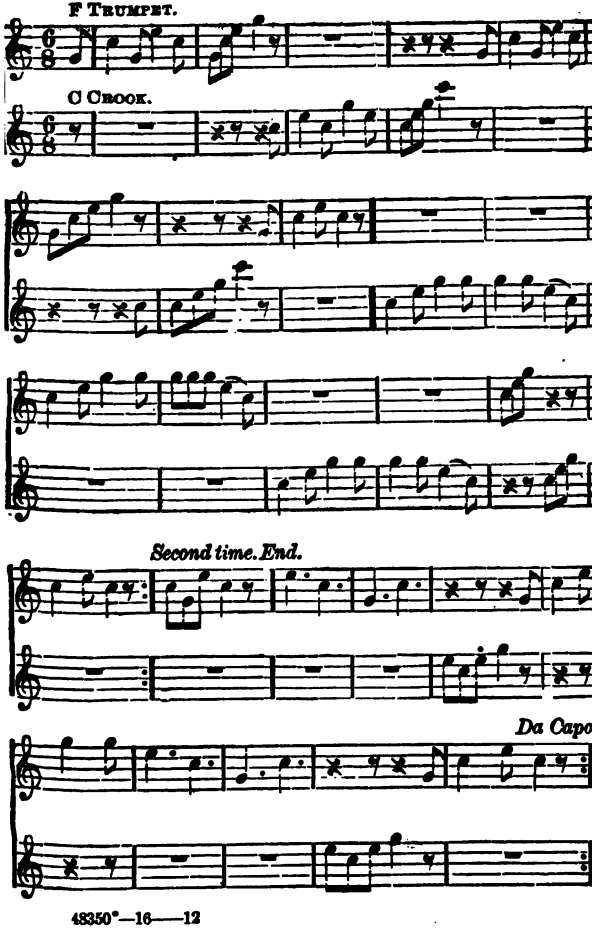
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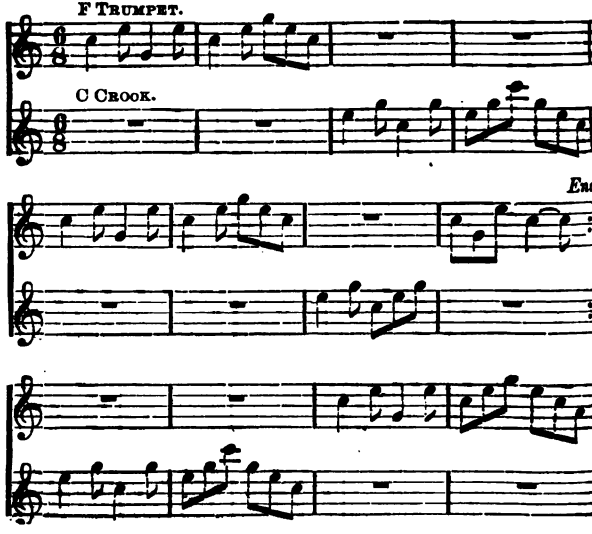
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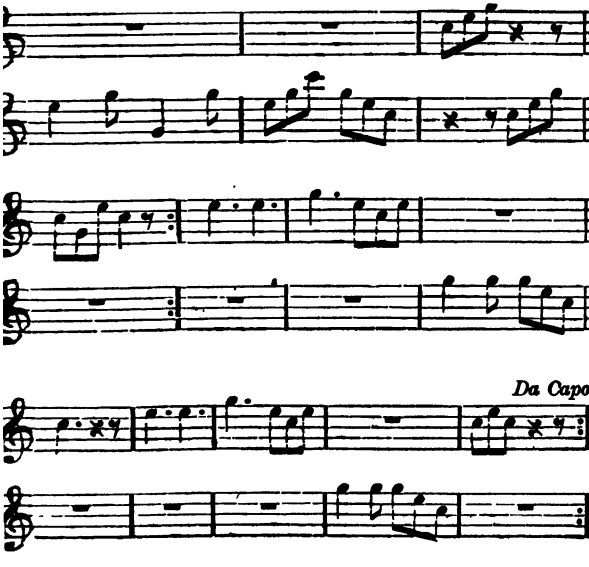
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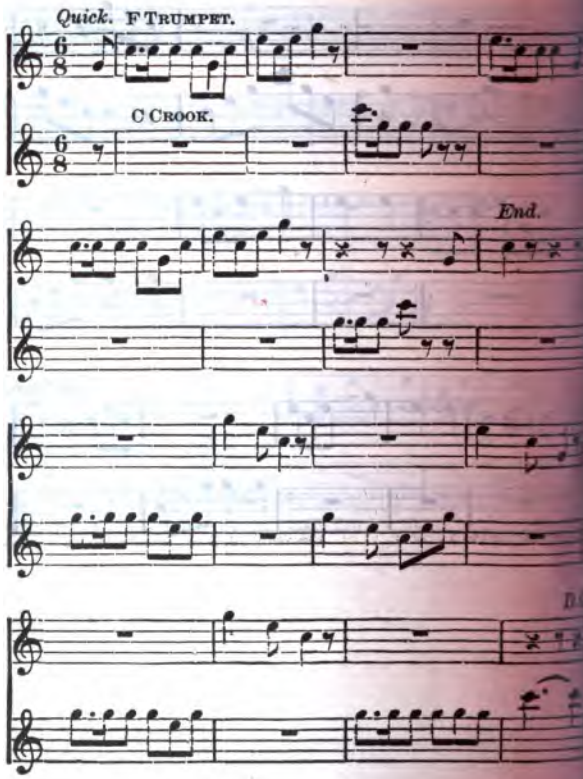
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1916

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PART IX.

FIRING INSTRUCTION.

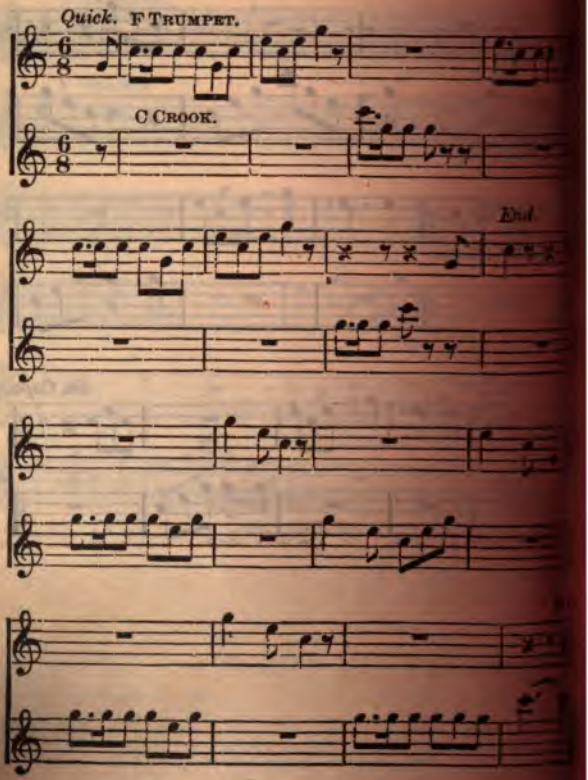
PTER I.—OBJECT AND SEQUENCE OF THE INSTRUCTION.

3. The objects of this instruction are:
To train the personnel in the mechanism of the methods of
o that, at the word of command, fire of the desired nature
be delivered with certainty and celerity. **(Fire discipline.)**
To train officers and their assistants so that they may
ze the weapons at their disposal to the best advantage.
duct of fire.)

4. A progressive order of instruction will be followed in
l case.
aining in the elementary duties of the two kinds should be
rtaken separately at first. Drill in the mechanism of fire
e essential feature of instruction of the first kind; practice
termining firing data and in adjusting fire under various
med condition the essential feature of instruction of the
d kind.

5. All officers and men should receive training in fire dis-
ne. It begins with the instruction of the **cannoneer**, passes
at of the **gun squad**, then to that of the **firing battery**, and
to that of the higher units.
e cannoneer must be taught to perform quickly and cor-
y the individual duties required of him in the service of the
. He must acquire such a thorough knowledge of these
s and such a well-grounded habit of performing them
erly that the service of the piece will not be affected by the
ement of action.
e gun squad must be trained as a unit, so that its indi-
al members work together smoothly, quietly, and effectively
erving the piece.

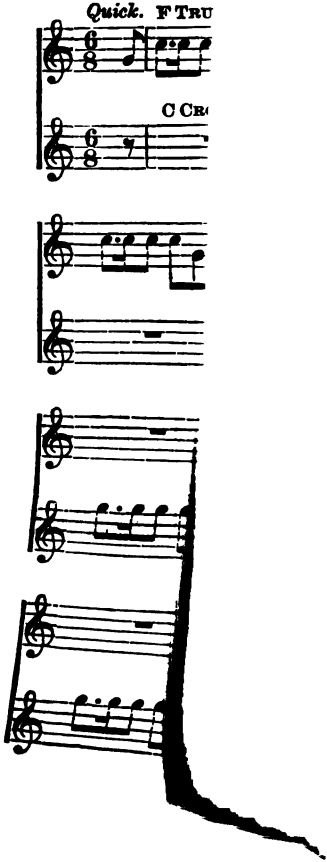
84. QUICKSTEP No. 10.



interest. The time spent in thoroughly training the inial cannoneer in the operation of the matériel will result reased rapidity and accuracy of the gun squad as a whole.
. The instruction of cannoneers and of gun squads will be the immediate supervision of one or more battery officers ed for this work.
. The permanent gunners and men skilled in the duties of and 3 can be used to advantage in the instruction of the ts. By assigning particular details of instruction to the men and by causing the recruits to pass from one to the of the instructors the instruction is expedited and unity is secured. The officer in charge must be careful that structors are accurate in their explanations and that they upon exact performance of the various duties.
. During instruction in the individual duties in the service e piece special stress must be laid on the necessity for accu-
. The recruits should be made to understand thoroughly speed is purely a matter of practice, but that accuracy can be obtained by forming the habit of exactness from the ning. Rapidity is increased by insisting that each indil performs his duties in regular sequence.
. To provide variety and so to maintain interest, instruction the duties of the gun squad (**929–1043**) may be begun a few days of instruction in the duties of cannoneers; but st-mentioned instruction must not be curtailed. The keepf records as to the time required by each cannoneer to perthe various duties and of the errors made not only stimuinterest but furnishes an intelligent basis upon which to men for permanent assignment to duties.

Section II.—Instruction in Matériel.

. The instruction begins with the first drills of the can-, and is carried on during the intervals of more advanced
. It is usually conducted in the park and should be pracin its nature, involving a careful and painstaking descripsupplemented by actual demonstration of the method of ition of the particular element of the matériel being de-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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, D. C., April 19, 1916.

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H. L. SCOTT,
Major General, Chief of Staff.

WAR DEPARTMENT
OFFICE OF THE CHIEF OF STAFF

PROVISIONAL

Drill and Service Regulations for Field Artillery

(Horse and Light)

1916

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Part IX

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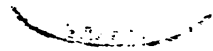

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H. L. SCOTT,
Major General, Chief of Staff.

The Ready.

865. The call **ready** by the gunner indicates to the chief section that the piece is accurately laid and is ready to fire.

To Avoid Injury.

866. Unless the gunner is careful **to move his head out of** way of the sight before the gun is fired, the shock of discha may bring the sight against his eye with sufficient force to i jure it.

The Command to Fire.

867. The gunner invariably gives or repeats the comm fire in actual or simulated firing, so as to insure his piece b fired at the proper time.

To Measure a Deflection.

868. The gun being established in direction by direct l or otherwise, the deflection may be measured by turning rotating head of the panoramic sight until the vertical cr hair is on the aiming point. The reading of the instrument then the deflecton sought.

869. The gunner is practiced in measuring the deflection follows:

The gun being laid in direction on any target with zero flection and the gunner seated on his trail seat, the instr commands, for example:

1. **Aiming point, that clock tower.**
2. **MEASURE THE DEFLECTION.**

1. The gunner turns the rotating head of the panoramic s until the vertical cross hair is on the designated aiming poi

2. He then reads and announces the deflection, thus: **De tion, 490.**

The instructor verifies the reading and sees whether sight is accurately directed upon the aiming point.

SECTION IV.—DUTIES IN DETAIL OF No. 1.

). The duties of No. 1 in the service of the piece are:
To set and release the brake.
To open the breech.
To set the site on the quadrant.
To set the range on the quadrant.
To center the cross level bubble of the quadrant.
To close the breech.
In indirect laying, to give the levation.
To call **set.**
To fire the piece.
To measure the site.

The Brake.

1. **To set the brake,** No. 1 grasps the brake-lever handle, s the lever down until the brake shoes come firmly against wheels, and then swings the handle in until the lever en- s in the rack.

2. **To release the brake,** No. 1 grasps the handle and pulls ever so as to tighten the brake somewhat and so enable him lease the lever from the rack by throwing the handle to one . Having released the lever from the rack, he pushes the dle up until the brake shoes are well away from the wheels.

3. No. 1 sets the brake as soon as the piece has been given general direction. Whenever the trail has to be shifted 1 releases the brake and sets it again as soon as the trail been reestablished.

The Breech.

4. **To open the breech,** No. 1 grasps the operating lever with left hand and compresses the lever latch. He then draws lever to the rear and right, thus swinging the block to the t. The lever should be drawn sharply so as to give the tor sufficient force to throw the cartridge case clear of the .

875. No. 1 opens the breech as soon as the gun is in posit and prepared for action and keeps it open at all times, ex when the piece is loaded, until the command for march o (**942**) or limbering (**202–203**) is given, when he closes it. is careful to see that the block remains fully away from breech so that it will not interfere with loading.

In opening the breech after firing the piece, No. 1 *half r* from his seat and, leaning to the rear, opens the breech as piece returns into battery.

The Site.

876. The site is the angle between a horizontal plane and line from the gun to the target. It is measured in mils a difference of one mil in site corresponds to a differenc level between the gun and the target of one one-thousandt the range.

877. On the right side of the body of the quadrant is the scale the divisions of which are marked 2, 3, 4, and 5. the level scale at the upper end of the micrometer screw is level micrometer scale which is divided into 100 equal p The site is set off on these scales. A complete turn of micrometer changes the reading of the level scale by division. One division on the micrometer is one *mil*; division on the level scale is therefore 100 mils and its g uated divisions are called 200, 300, etc. Three hundred c sponds to targets at the level of the gun; below 300 corres to targets below the gun; and above 300 to those above the

878. To set off the site, No. 1, with his right hand, turns micrometer screw until the number of hundreds of the se is shown by the level index and the number of tens and u is shown by the index of the micrometer. It is necessary setting the site that No. 1, after setting the level scale, p his head so as to look squarely down on the micrometer. must form the habit of moving the micrometer scale in a c wise direction to increase the site setting, in a counterclock direction to diminish the setting.

9. No. 1 is practiced in setting sites by command.
e quadrant being in its socket, the instructor commands, for
ıple: **Site, 315.**
. 1 turns the micrometer screw until the index of the level
is between the graduation marked **3** and the graduation
ked **4**, and the index of the micrometer reads **15.**
ıe instructor verifies the setting.

The Range.

0. In indirect laying the range is set off on the range disk
he quadrant. The range disk is graduated from zero to
) yards. The least reading on the scale is 50 yards, but the
e may readily be set by eye to a least reading of 25 yards.
1. **To set off a range,** No. 1 turns the scroll gear handle
the left hand until the index is opposite the designated
ge. In setting a range, it is important that No. 1 place his
d so that his eye will be squarely opposite the range scale.
it is necessary to make a considerable change of reading,
slow-motion mechanism is ungeared by drawing out the
lle. By pushing up or down, the scale is moved until it is
the desired setting. The tension on the handle is then
used and the slow-motion mechanism is thrown into gear
used to effect an accurate setting.
2. No. 1 is practiced in setting ranges by command.
he quadrant being in or out of its seat the instructor com-
ds, for example: **2550.** No. 1 manipulates the handle with
eft hand until the index is brought opposite the designated
ing.
ıe instructor verifies the setting.

The Cross Level.

3. **To center the bubble of the cross level,** No. 1 turns the
s level screw with the right hand. The centering of this
ıle is necessary in order to avoid errors in the elevation of
piece due to a difference in level of the gun wheels. No. 1
ıreful to keep the cross bubble centered at all times.

The Breech.

884. To close the breech, No 1 places the middle of the p of his open left hand against the operating lever, pushes lever to the left, and swings the block smartly to its seat.

The Elevation.

885. When the quadrant is set and the elevation is give No. 1 the laying is said to be **indirect.** The signal that ind laying is to be used is the command: **Aiming point (So-and-**

The signal that direct laying is to be used and that c quently No. 1 is not to set the quadrant or give the elevati the command: **Target (So-and-so).** In direct laying No. 1 be careful not to touch the elevating mechanism.

886. To give the elevation to the piece, No. 1 operates elevating handle until the bubble of the elevation le centered.

Turning the elevating handle clockwise moves the bub the front and increases the elevation and the range, and versa. It is important that this become second nature to N

887. No. 1 may be practiced in his duties of laying for el tion as follows:

No. 1 being seated on his trail seat, at the piece unlimbe the quadrant in its seat and the cross level bubble centered, instructor commands, for example:

1. **Site 280.**
2. **3400.**

1. At the command for the site No. 1 sets it off with his hand.

2. Sets the range with his left hand.

3. Centers the cross level bubble, if necessary.

4. Centers the bubble of the elevation by turning the el ing handle with his right hand.

5. Calls **set** when he has laid the piece accurately for elev

The instructor verifies the settings and the centering of bubbles.

The Set.

38. The call **set** by No. 1 indicates that so far as he is concerned the piece is accurately laid.

As soon as he calls **set** No. 1 grasps the firing handle with the right hand.

When the chief of section cautions **with the lanyard,** No. 1 attaches the lanyard to the firing mechanism and, after calling **clear,** steps clear of the wheel, holding the end of the lanyard in his left hand.

To Fire.

39. **To fire the piece,** No. 1 at the command of his gunner depresses the firing handle down with his left hand, so as to release the firing pin. It is important that No. 1 form the habit of using only his left hand to fire the gun. This makes it impossible for him to have any part of his body in the way of the gun *during* recoil.

In firing with the lanyard, No. 1 pulls on the lanyard until the firing pin is released. The lanyard is not used except when the ground is such that the trail spade is not easily seated and it is usually necessary only for the first shot.

To Measure the Site.

40. The gun is first laid directly on the target by the gunner who sets the sight shank at any convenient range, the elevation at zero, and brings both the cross hairs on the target by traversing and elevating the piece. No. 1 then sets the range disk of the quadrant at the same range as that on the sight shank and centers the bubble of the elevation level by turning the micrometer screw. The site reading is the site of the target.

891. No. 1 is practiced in the duty of measuring the site follows:

The gun being accurately laid on the target by means of panoramic sight, the sight shank being set at any conve range, 2700, for example, the instructor commands:

1. **Measure the site.**
2. **2700.**

1. At the command 2700, No. 1 sets 2700 on his range dis
2. Centers the cross level bubble, if necessary.
3. Centers the bubble of the elevation level by turnin micrometer screw.
4. Calls out the site reading, thus: **Site 330.**

The instructor verifies the quadrant settings and the ce ing of the bubbles.

SECTION V.—DUTIES IN DETAIL OF NO. 2.

892. The duties of No. 2 in the service of the piece are:

1. To shift the trail so as to give the general directi the piece.
2. To throw the empty cartridge cases out of the wa the gun squad.

To Shift the Trail.

893. For the assistance of No. 2, the upper edges of the and main shields should be graduated in mils, and each divi of 50 mils should be marked. No. 2 should also be instru as to the value in mils of the width of the trail spade a the float.

With the origin at the middle of an upper edge the divi on the shields should be for the average case with the 3- field gun 6, 12, 18.1, and 24.5 inches from the origin to indi divisions of 50, 100, 150, and 200 mils, respectively. The dle of the top of the tire is approximately 250 mils from center division.

A shift of the trail by the width of its mark in the gr corresponds to a change of direction of about 150 mils.

A shift of the trail by the width of the float corresponds a change of direction of about 220 mils.

94. To shift the trail, No. 2 stands immediately in rear of trail handspike, feet about 18 inches apart, and grasps handspike with both hands.

95. When the target is visible and direct laying is used, No. ghts along the barrel and shifts the trail so as to point the directly at the target. Unless the target is moving it should be necessary to shift the trail during the firing. In the case noving targets No. 2, after once pointing the piece at the et, does not shift the trail until he gets the gunner's com- d: **Muzzle right (left).** He then shifts the trail so as to g the piece again on the target.

henever it is necessary to shift the trail in direct laying, 2 watches the gunner and does not complete the shifting of trail until the gunner has traversed the gun to the center or ne extreme of its movement on the carriage (864).

96. No. 2 is practiced in pointing the piece directly at the get.

he piece being in position and No. 2 at the trail handspike, instructor commands, for example:

Target, that house.

o. 2 points the piece quickly on the designated target.

he instructor verifies the pointing with the panoramic sight at zero deflection.

97. When the piece is laid for direction by the use of an ing point (**indirect laying**), No. 2 gives the original direction he piece by shifting the trail in accordance with the com- ds or signals of the chief of section, or of some one repre- ing the chief of section.

signal to No. 2, the chief of section extends his arm ard the trail, palm of the hand turned and fingers pointing he direction in which the trail is to be moved. To indicate the direction is correct and that the trail is to be lowered, chief of section commands: **Trail down;** the corresponding al is the bringing of the extended arm sharply to the side.

98. No. 2 is practiced in giving the piece its initial pointing ndirect laying. In these exercises an aiming point is taken, sight is set at an appropriate reading and the chief of sec-

tion, looking along a side of the rotating head, causes the g to be given its proper direction.

No. 2 should also be instructed as to what should be the a proximate direction of the piece when the sight, set at differ deflections, is directed on an aiming point.

899. After the initial direction has been given, No. 2, in in rect laying, shifts the trail whenever the deflection is chang by 50 mils or more and also whenever he gets the comman **Muzzle right (left).**

No. 2 must thoroughly understand that shifting the trail t the right (left) moves the muzzle to the left (right).

900. No. 2 is practiced in shifting the trail at the comm for a deflection change of 50 mils or more.

The piece being in position and No. 2 at the trail handsp the sight directed on an aiming point, the instructor comma for example:

1. **Right 100.**
2. **Trail down.**

1. At the command **Right 100,** No. 2, standing in his posi for shifting the trail, locates an object, as far away as possi which is in line with the graduation marked 100 on the *right* o the top of the shield, and shifts the trail to the **left** so as t bring the center division on the shield in line with *the obje* selected.

2. At the command or signal **trail down** No. 2 lowers the tra The instructor makes the appropriate change in the deflec setting and verifies the accuracy of the work of No. 2.

If it be impracticable to select a definite object upon wh to sight, No. 2 judges the amount by which the **trail must** shifted by the width of the trail spade or float **(898).**

Empty Cartridge Cases.

901. To keep the empty cartridge cases out of the way of t gun squad, No. 2 catches the cases as they are ejected from t gun and throws them a little to the rear of the caisson wh farthest from the piece.

Section VI.—Duties in Detail of No. 3.

902. The duties of No. 3 in the service of the piece are:
. To set the corrector.
. To set the range on the fuze setter.
. To set the fuze when the hand fuze setter is used.

The Bracket Fuze Setter.

903. The fuze setter is a device for setting time fuzes so that projectiles will burst in the air at such height as may be fired. It has a range scale and a corrector scale.

The range scale is graduated in yards from 0 to 6400, its least ding being 50 yards. When a shrapnel is turned in the fuze ter, the fuze is set so that the projectile will burst, after ing fired, at about the range set off on the range scale.

The corrector scale is uniformly graduated into 60 divisions. ery tenth division is numbered in figures 0, 10, 20,——60. e purpose of the device is to change the time of burning of fuse, independently of the range scale, and thus to control point at which the projectile bursts. Under normal condins a change of fuze setting by one unit of this scale produces ariation of about 1 mil in the height of burst of the projec-. The middle graduation of the scale, 30, corresponds eoretically to the normal height of burst, 3 mils.

904. Increasing the corrector reading shortens the time of rning of the fuze and hence raises the point of burst of the jectile; decreasing the corrector reading lengthens the time burning of the fuze and hence lowers the point of burst of projectile.

The corrector scale thus affords the means of correcting an served error in height of burst and of adjusting the mean int of burst at the proper height.

905. To set the corrector, No. 3 turns the corrector worm knob th the right hand so as to bring the movable index opposite e corrector reading ordered. It must become habitual with . 3 to turn the corrector knob in a clockwise direction to

decrease the reading, and to turn the knob counterclockwise to increase the reading.

906. To set the range, No. 3 turns the range worm crank, with either hand, so as to bring the range reading opposite the fixed index of the range scale. It must become habitual with No. 3 to turn the range crank clockwise to increase the reading and to turn the crank counterclockwise to decrease the reading.

907. In setting either scale, No. 3 must be trained to place his head so that he looks squarely at the scale and its index.

908. No. 3 is repeatedly practiced in setting the scales of the fuze setter by command.

The caisson being in position with the fuze setter lowered and No. 3 being seated at the fuze setter with his back to the inside of the right wheel of the caisson, the instructor commands, for example:

1. Corrector 28.

2. 3600.

1. No. 3 sets off the corrector as soon as it is announced.

2. Sets the range scale at the range ordered.

The instructor verifies the settings.

909. The corrector having once been set, changes in the setting are usually made at the command: **Up (Down) (So many).**

The command **up** means that the corrector reading *is to be* increased; **down** means that the corrector reading is to be diminished.

No. 3 is practiced in this method as follows:

The corrector having been set at 28, the instructor commands, for example:

1. Up 5.

2. 3400.

1. No. 3 increases the corrector reading by 5 points and, accordingly, sets corrector 33.

2. Sets the range at 3400.

The instructor verifies the settings.

910. Even though time fire is not being used, No. 3 always keeps his scales set according to the commands. If percussion fire is being used, No. 3 is thus always ready to pass to time fire.

The Hand Fuse Setter.

1. The hand fuse setter is used only when the bracket fuse setter is not available. No. 3 sets the scale in a manner similar to that described for the bracket fuse setter. He sets the fuze, No. 5 holding the round.

) set the fuze with the hand fuze setter. No. 2 engages the setter on the fuze and turns the fuze setter to the right a steady and uniform motion until the lug on the fuze es firmly against the fuze-setter stop.

Section VII.—Duties in Detail of No. 4.

2. The duties of No. 4 in the service of the piece are
In time fire to complete the setting of the fuze.
To insert the round in the breech.
In volley fire to call out the number of the round

To Complete the Fuze Setting.

13. The signal that time fire is to be used is the command : ector (So much). The signal that percussion fire is to be l is the commmand : Shell, or Percussion.

14. In time fire, to insure correct setting of the fuse No. 4 as the projectile to the right before removing it from the e setter, being careful not to turn it until the scale has been set.

n turning the projectile, No. 4 stands slightly to the left rear of the fuse setter facing to the right front. His left d, back down, grasps the round at or near the forward end he cartridge case. The palm of the right hand is placed on base of the cartridge case, the fingers grasping the edge of base. While turning the projectile, No. 4 takes care to hold body of the projectile down on the gunner, and to keep the fuse engaged by a steady pressure on the base of the cartridge with the right hand. The projectile should be turned with teady and uniform motion until the lug on the fuse comes ily against the fuse setter stop.

To Insert the Round.

915. In time fire: Having accurately set t withdraws the round from the fuse setter, tak it straight out so as to avoid any possibilit setting. At the same time No. 4 slips hi the point of the projectile until it is about gravity of the round. As soon as the fuse is clear of the fuze setter No. 4 springs toward the breech, st off with the right foot. As he approaches the gun he the point of the projectile slightly above the base and the weight of the round to be supported by the left hand. fingers of the right hand are rigidly extended, the palm hand being kept firmly pressed against the base of the car case. Taking position to the left and rear of the breech front of his body being parallel to the axis of the bore, ey the breech recess, No. 4 inserts the nose of the projecti the chamber and shoves it forward, the extended right being brought sharply against the face of the breech. closing of the breech insures the proper seating of the p tile. As soon as he has inserted the round, No. 4 qu resumes his position at the fuse setter.

916. When the hand fuse setter is used, and in percu fire, No. 4 receives a round of ammunition directly *from* N (**919**) and inserts it as above prescribed.

917. In percussion fire No. 4, after taking a round from N stands at his position at the breech and loads the piece as **as the previous round has been fired.** No. 4 is thus always r to load the piece without loss of time. He takes car stand clear of the breech during recoil.

918. No. 4 is practiced in setting the fuse and in loading piece. His training in his duties in volley fire is not b until drill in the duties of the gun squad combined is c menced.

SECTION VIII.—DUTIES IN DETAIL OF NO. 5.

919. The duties of No. 5 in the service of the piece are:

1. To take ammunition from the chest.

2. When the bracket fuze setter is being used, to insert round in the fuze setter and to set the fuze.

When the hand fuze . PRELIMINARY TO INSTRUC-
le No. 3 sets the fuze. RING BATTERY.

To pass the round directly t. PROVISIONS.
n the hand fuze setter is used in.

heir individual duties

To Remove a Round from the he composition and
ll those exercises

20. To take a round from the chest, No. 5 e guns in posi-
left rear of the round selected, grasps the
tridge case with the fingers of the right hand, pull he orderly
the rear, across the front of his body, and catches as upon
the projectile with the left hand. As soon as he is nbined
one round No. 5 immediately takes another from the can-
ns,
of

The Bracket Fuze Letter.

921. When the bracket fuze setter is used, No. 5 strips off the e
terproof hood of the fuze. He then inserts the point of the
jectile in the fuze setter, taking care that the lug nearest
point of the fuze engages in the groove in the fuze setter,
l sets the fuze for the settings then on the fuze setter as
scribed for No. 4.

922. Having set the fuze, No. 5 immediately takes another
nd from the chest, strips off the waterproof hood, and stands
ady to insert the round in the fuze setter as soon as No. 4
s withdrawn the previous round.

The Hand Fuze Setter.

923. When the hand fuze setter is used, No. 5 holds the round
dle No. 3 sets the fuze. Nos. 3 and 5 should occupy the same
ative positions that they have in using the bracket fuze
ter. As soon as No. 5 has withdrawn the round from the
st and stripped off the hood, he faces to the right rear and
eels on the right knee. The round is placed with the base
the cartridge case against the right knee, the edge resting on
e ground. The point of the projectile is up so that the axis
the round is pointed in the direction of No. 3's head. No. 5

grasps the round with both hands, the right arm resting on t right thigh, back of the right hand up. The left arm re against the outside of the left leg, back of the left hand do

To Pass a Round to No. 4.

924. When he passes a round to No. 4, No. 5 places the ri hand under the center of the cartridge case and the left h under the center of the projectile, backs of both hands do The round is held horizontally and well away from the b the base of the cartridge case being presented to No. 4. N receives the round by passing his left arm under the right a of No. 5, grasping the round between the hands of No. 5, at same time grasping the base of the cartridge case with the r hand.

SECTION IX.—DUTIES OF NOS. 6 AND 7.

925. Nos. 6 and 7 have no specific duties in the service of piece after it is established in position. They act as s cannoneers.

926. Upon going into action, Nos. 6 and 7 are utilized for construction of concealment for the carriages, for line gua on the telephone lines, for the resupply of ammunition, e This work is done under the immediate supervision of t executive or his assistant.

SECTION X.—COMBINED TRAINING AT THE PIECE AND AT THE CAISSON.

927. The duties of the gunner and Nos. 1 and 2 are mutu dependent. So also are those of Nos. 3, 4, and 5. Hence, i advisable, at an early stage of instruction, to train each these combinations separately. The same practice may be u to advantage from time to time after the drill of the gun squ in the firing battery has been taken up.

928. After the cannoneers are thoroughly instructed they a permanently assigned to those positions in which they ha shown themselves most capable.

APTER III.—EXERCISES PRELIMINARY TO INSTRUCTION OF THE FIRING BATTERY.

SECTION I.—GENERAL PROVISIONS.

29. Coincident with instruction in their individual duties in matériel, the recruits are taught the composition and nation of the gun squad and its duties in all those exercises ch are preliminary to the establishment of the guns in posi- to fire (170–203).

30. The efficient service of the gun depends upon the orderly peration of the members of the gun squad, as well as upon skill of the individual cannoneers. The habit of combined rt must hence be acquired.

31. An alert and soldierly manner is exacted of the can- eers. Accuracy and exactness are the first considerations, the cannoneers should be taught, with the acquisition of curacy to perform their duties briskly and rapidly. The ect in view is the gradual development of great rapidity of vice without reduction of accuracy. To delay too long in shing the development of rapidity leads to inattention, venly service, and an actual loss of accuracy. On the other nd, striving for rapidity before the training has sufficiently ogressed, is certain to result in great and frequent errors.

32. On account of their value in developing the recruit, fix- g his attention, improving his control over mind and muscles, d varying the monotony of instruction, the training of re- uits in the exercise of the gun squad should begin after the st two or three days of individual instruction.

33. Movements of the carriages by hand, the formation of gun squads, the posting of the cannoneers, mounting and mounting, etc., are of value in developing the alertness of recruits, if it is insisted that such movements be performed the double time and smartly. As the training progresses, the mmand for one of these exercises should more and more sely follow the execution of the previous one. The older

men also must be frequently exercised in such movements, the smartness of the gun squads is to be preserved.

934. Steps must be taken to make the position of cannoneer attractive and to encourage the gun squads to develop team work to the utmost.

935. In the instruction of the gun squads it is usually best to exercise four squads as a firing battery. When practicable, chiefs of section should be present at all drills of gun squads.

The battery commander should frequently conduct the drill of the gun squads to the end that the men may become accustomed to his voice and method of giving commands. In any event the drill must be under the direct supervision of an experienced and capable officer. This training is too important to trust it to an inexperienced officer except under the close supervision.

936. When for any reason it is desirable to drill less than four gun squads, the commands and methods are similar to those for the complete firing battery.

SECTION II.—TO MOVE BY HAND THE CARRIAGES UNLIMBERED.

937. 1. **Pieces (Caissons) forward (backward),** 2. **MARCH,** 3. **HALT.**

Each piece: The gunner and No. 2 grasp the trail *handles*, the gunner the left, No. 2 the right handle; Nos. 1 and 3 the right and left wheels, respectively; Nos. 4 and 5 place themselves so as to work advantageously at the breech of the piece in moving forward, at the muzzle in moving backward. Nos. 6 and 7 assist at the nearest wheels. At the command **march** all working together move the carriage in the direction indicated. At the command **halt**, they stop the carriage and resume their posts.

Each caisson: Executed as explained for the piece, except that Nos. 4 and 5 are at the trail of the caisson and that the gunner and No. 2 work in rear of the caisson chest in moving to the front, against the footboards in moving to the rear.

SECTION III.—PREPARATION FOR ACTION AND MARCH ORDER.

To Prepare for Action.

938. The carriages being in position unlimbered: **PREPARE OR ACTION.**

Each member of the gun squad performs his duties in the der given below:

Gunner: (*a*) Removes the hood from the sight bracket;

(*b*) Releases the traversing and elevating lock and operates ıe traversing and elevating gear;

(*c*) Removes the sight shank from its case and places it in s socket, setting the range at 3,000 and the peep sight deflec- on at zero;

(*d*) Takes the panoramic sight from its case and places it ı its seat, making sure that the sight is clamped and that the leflection is set at zero;

(*e*) Raises and secures the top shield, with the assistance f No. 1;

(*f*) Seats himself on his seat.

No. 1: (*a*) Removes the quadrant from its case and places t in its seat; centers the cross level bubble;

(*b*) Sets the range at 3,000 and the sight at 300, and brings he range bubble to the center;

(c) Equips himself with a lanyard and a wiping cloth;

(*d*) Operates the breech mechanism, examines the breech block, bore, and chamber, cleaning any parts requiring it, eaving the breech open, except when the gun is loaded;

(*e*) Assists the gunner in raising and securing the top hield;

(*f*) Seats himself on his seat.

No. 2: (*a*) Removes the breech cover;

(*b*) Turns back the trail handspike and engages it;

(*c*) Runs around to the right of the piece and tssists No. 8 to lower the piece apron;

(*d*) Distributes tow or waste to the connoneers for use in their ears;

(*e*) Seats himself on the handspike.

No. 3: (*a*) Runs around the left of the caisson and remov the muzzle cover;

(*b*) Removes the front sight cover and adjusts the sight f its firing position;

(*c*) Lowers the piece apron, with the assistance of No. 2;

(*d*) Seats himself at the fuze setter, with his back to t right caisson wheel;

(*e*) Sets his scales at corrector 30, range 3000.

No. 4: (*a*) Assisted by No. 5, lowers the caisson apron;

(*b*) Lowers the fuze setter;

(*c*) Assisted by No. 5, raises the caisson door;

(*d*) Stands ready to serve ammunition.

No. 5: (*a*) Assists No. 4 to lower the caisson apron;

(*b*) Assists No. 4 to raise the caisson door;

(*c*) Puts a round of shrapnel in the fuze setter, setting t fuze;

(*d*) Stands ready to serve ammunition.

The cannoneers report to their chief of section if any p of the matériel are not in working order.

939. The carriages, limbered, are habitually prepared f action before reaching the firing position. The duties of t cannoneers are the same as at the carriages unlimbered, exc that after the examination of the elevating and traversing g the piece is secured by the traveling lock; the trail handspik is not turned back; the breech is closed; the firing pin is r leased; the fuze setter is not lowered, nor is a round put in fuze setter; the apron is not lowered; the caisson door is closed; and the cannoneers do not take their posts for ser the gun. The gunner and No. 1 return the panoramic sight the quadrant to their cases, unless special orders to the c trary are given.

Immediately after establishing the carriages the preparat for action is completed without command and the cannon take their posts for serving the piece.

940. If prepare for action has not been given before est lishing the carriages in the firing position, that command habitually given by each chief of section as soon as his c riages have been unlimbered and established. The instru

y, however, caution do not prepare for action when he wishes drill the personnel in limbering and unlimbering only or in details of preparation for action.

sts of the Cannoneers, Carriages Unlimbered and Prepared for Action.

941. In each squad, the gunner, seated on his seat facing the n.

No. 1, seated astride his seat facing the gun.

No. 2, seated astride the trail handspike near the trail.

No. 3, seated with his back to the inside of the right caisson ieel, facing the bracket fuze setter, legs extended one on each le of the fuze setter.

Nos. 4 and 5, in rear of the caisson in a convenient position r the performance of their duties.

Nos. 6 and 7, abreast and in order from right to left, 5 yards rear of the trail spade of their piece, awaiting orders.

Higher numbered cannoneers, if present, accompany the abers.

In the Horse Artillery the two highest numbered cannoneers t as horse holders and take the lead horses to the rear with limbers.

To Resume the Order for Marching.

942. The carriages being prepared for action, to resume the ler for marching: **MARCH ORDER.**

Each member of the gun squad performs his duties in the ler given below:

Gunner: (*a*) Lowers and secures the top shield, with the sistance of No. 1;

(*b*) Sees that the deflection reading is zero, returns the panoic sight to its case and secures the case;

(*c*) Replaces the cover on the sight shank and returns it to trail box;

(*d*) Traverses and elevates the piece to the traveling posin and fastens the traveling lock;

(*e*) Secures the hood over the sight bracket.

(*f*) Takes his post.

No. 1: (*a*) Assists the gunner in lowering and securing the top shield;

(*b*) Closes the breach; releases the firing pin;

(*c*) Returns the lanyard and wiping cloth to the trail box;

(*d*) Sets the range at 3000 and the site at 300;

(*e*) Returns the quadrant to its case and secures the case;

(*f*) Takes his post.

No. 2: (*a*) Assists No. 3 to raise and secure the piece apron;

(*b*) Turns down and secures the trail handspike;

(*c*) Replaces the breech cover and secures it;

(*d*) Takes his post.

No. 3: (*a*) Sees that the fuze of any round whose fuze has been set, is set back at safety;

(*b*) Sets fuze setter at range 3000, corrector 30;

(*c*) Raises and secures the piece apron, with the assistance of No. 1;

(*d*) Replaces the front-sight cover and adjusts the front sight in the traveling position;

(*e*) Replaces and secures the muzzle cover;

(*f*) Takes his post.

No. 4: (*a*) Assists in setting fuzes back at safety;

(*b*) Passes the round to No. 5;

(*c*) Assisted by No. 5, lowers and secures the caisson door;

(*d*) Raises and secures the fuze setter;

(*e*) Assisted by No. 5, raises and secures the caisson apron;

(*f*) Takes his post.

No. 5: (*a*) Receives ammunition from No. 4 and stores it in the chest;

(*b*) Assists No. 4 to lower and secure the caisson door;

(*c*) Assists No. 4 to raise and secure the caisson apron;

(*d*) Takes his post.

If it is intended to resume the fire, but in another position so that the limbering of the carriage is necessitated, the command **MARCH ORDER** is not given. At the command for limbering the carriages are placed in the order described in paragraph **989**.

943. If the situation is such as to make it probable that the ns will have to defend themselves from close attack the com- and **sights for fire at will** may be added either to the command preparation for action or to that for resuming the march ler. At such command, the gunner sets deflection zero, range 00; No. 3 sets corrector 30, range zero.

IAPTER IV.—THE FIRING BATTERY AND THE DUTIES OF ITS GUN SQUADS.

CTION I.—COMPOSITION, FORMATION, AND INSTRUCTION OF THE FIRING BATTERY.

944. **The firing battery** comprises the guns and caissons of e first five sections of the battery, with the personnel and imals assigned to their immediate service. It is under the rect command, or orders, of the captain. The most suitable utenants (82) of the battery is selected for the immediate mmand of the firing battery when the battery commander is some distance from the guns, and for the immediate super- sion of the gun squads when the battery commander is near ough to the guns to give his orders and commands by word mouth. This lieutenant is the **executive.** When the number lieutenants present permits, the executive has a junior lieu- nant assigned to him as assistant.

945. For the instruction of recruits the drill of the gun uads is at first carried on in the park. Later the instruction the firing battery is carried on over all forms of terrain ailable.

In the field it is desirable that the guns be placed approxi- ately in line with regular intervals of approximately 17 yards tween adjacent gun wheels. It is more important that the tervals be regular than that they be exactly 17 yards. Each ief of section cautions (Such) **piece,** or, **No. (So-and-so),** as on as his carriages have been established in position (47).

In the park the limbered carriages are formed in line or lumn of double sections, the caisson of each section being longside of and at two yards interval from its piece, at such

intervals or distances between sections as may be practicable. By the execution of **action front (rear, right, or left)** the carriages are placed in line in the firing position at sufficient intervals for the drill of the gun squads.

946. At the commencement of training of recruits in their duties in the firing battery, their instruction in the elementary principles of gunnery contained in this chapter will be begun. As the instruction progresses and the recruits are divided into classes, each class should be instructed in so much of the principles involved in **Service Firing** as the men of the particular class can thoroughly grasp.

SECTION II.—DUTIES IN GENERAL OF OFFICERS OF THE FIRING BATTERY AND OF THE NONCOMMISSIONED OFFICERS OF THE GUN SECTIONS.

947. Captain:

Commands the firing battery and, as a rule, conducts the fire.

948. The executive:

1. Usually conducts the firing battery to and establishes it in the firing position. Causes such measures to be taken as will facilitate the rapid opening of accurate fire. Sees to the preparation of all practicable protection for the personnel in addition to that provided by the shields.

2. Exercises immediate command of, or supervision over, the battery in the firing position.

3. Repeats all firing data when the captain is not near enough the battery to command it by voice.

4. Gives the command for commencing firing whether the captain be at the battery or not. The command by the executive is **Fire.** It is usually accompanied by a signal made by bringing the extended right arm from a vertical position sharply to the side. For salvos the executive gives the command **fire** as soon as he sees that all the pieces will be ready to fire in their proper turn. For volleys he may give the command **fire** immediately after the range has been announced or he may wait until all the pieces are ready, according to the instructions of the captain.

. Assisted by the chief mechanic attends to the resupply of munition, under such general instructions as the captain y give.

. Has charge of the replacement of casualties.

49. Assistant to the executive:

ssists the executive in the supervision of the gun sections, ecially when difficulties or errors occur in a gun squad.

50. Chief of gun section:

. Commands his section.

. Makes sure of the identification of his part of the target of the aiming point.

. Keeps informed of the firing data so as to be able to re- t any parts not understood by the cannoneers but does not eat anything unless it is called for by a subordinate. If a f of section does not understand any item of the firing data asks the executive for it thus: Site? Corrector? etc.

. In indirect laying whenever the trail has to be shifted, 's the gunner approximately on the aiming point by glancing ng one side of the rotating head of the panoramic sight and sing the trail to be shifted until the side of the rotating d is in line with the aiming point (**897**).

Commands **with the lanyard** for the first shot when the ind is such that the trail spade is not easily seated, and that all the cannoneers step clear of the piece for the first .

Extends his right arm vertically as soon as the gunner called **ready**, so as to indicate to the executive officer that piece is ready to fire. The right arm is held vertical until gunner commands **fire.**

Supervises and is responsible for all the details of cor- service by his gun squad.

51. Gunner:

Performs his duties in the gun squad.

Commands **muzzle right (left)** when he has reached the t of traverse of the gun on the carriage.

Commands **fire** so that his piece will be fired, **after having** n **accurately laid,** at the proper time.

960. Since the deflection difference for any two adjac pieces is the same, each gunner must multiply the deflecti difference by the number of gun intervals between his pi and the directing piece in order to find the amount by wh his deflection will differ from that of the directing piece.

961. The gunner of the directing piece does not change his flection on account of the deflection difference.

In order to open out the sheaf the guns on the right of t directing piece must have their muzzles moved to the right those on the left of the directing piece must have their muz moved to the left. Since decreasing the deflection moves muzzle to the right and throws the shot to the right, each g ner on the right of the directing piece, in order to open sheaf, must multiply the deflection difference by his num of intervals from the directing piece and subtract the re from the deflection announced. Since increasing the deflecti moves the muzzle to the left and throws the shot to the each gunner on the left of the directing piece, in order to the sheaf, must multiply the deflection difference by his num of intervals from the directing piece and add this result t deflection announced.

962. Conversely, to close the sheaf on the directing piece, t gunners on the right must increase the deflection or add to it as to throw the muzzles of their guns toward the directi piece, while those on the left must decrease the deflection subtract from it in order to throw their muzzles toward t directing piece.

963. When the aiming point is in certain positions it m happen that the fire will be properly distributed on the tar when the deflection of all the pieces is the same, or when t deflection difference is zero. The absence of any comma **open** or **close** is the indication that all the pieces are to be l with the same deflection.

964. After the first or subsequent firing, one of the guns m be directed on its part of the target while the others are not. I such cases the captain does not change the deflection but brin all the guns on the target by opening or closing on the g which has the proper direction.

5. The gunners are trained in setting off the corrected de-
on individually as well as during the instruction of the
squads.

r example: 1. Deflection 1620; 2. On 1st piece, Open 10. All
unners set 1620 as soon as it is announced. As soon as
it piece, Open 10 is given the gunner of the 2d piece multi-
10 by his interval (one) and adds the result (10) to 1620,
accordingly sets 1630. The gunner of the 3d piece multi-
10 by his interval (two) and adds the result (20) to 1620,
accordingly sets 1640. The gunner of the 4th piece multi-
10 by his interval (three) and adds the result (30) to
and accordingly sets 1650.

ie sights being set as above,. for example, the command
be: On 3d piece, Close 5. The third piece becomes the
cting piece and its gunner leaves his sight reading at 1640.
gunner of the 4th piece multiplies 5 by his interval (one),
racts the result (5) from 1650, and accordingly sets 1645.
gunner of the 2d piece multiplies his interval (one) by 5,
s the result (5) to 1630, and accordingly sets 1635. The
ner of the 1st piece multiplies his interval (two) by 5, adds
result (10) to 1620, and accordingly sets 1630.
he instructor verifies the settings.

66. It is most important that all the gunners first set the
ection ordered and then apply the deflection difference.
s method avoids errors and results in greater rapidity than
btained should the gunner attempt to make all of his calcu-
ons and then to set off the resulting deflection.

67. It may be that the aiming point can be seen from only
piece. In such cases the executive, after announcing the
ection, commands: Lay on (Such) piece, designating the
ce from which the aiming point can be seen. At this com-
nd each chief of section, except that of the piece designated,
ises his gunner to turn his sight in the direction of the
ignated piece and his No. 2 to extend the rammer staff
tically in front of the object glass of the sight. The desig-
ted piece having been accurately laid at the indicated deflec-
n, its chief of section causes the gunner to turn his sight,
thout traversing the piece, so that the vertical hair will

bisect the rammer staff at the other pieces in succession a announces the reading, thus: **No. (So and so), (So much).** T chief of section of the piece which can see the aiming p then causes No. 2 to extend his rammer staff vertically alo side the sight.

As the reading for his piece is called off, each chief of sect who is unable to see the aiming point substracts 3,200 from t reading announced if he is on the left of the piece from wh the aiming point can be seen, or adds 3,200 to the reading if is on the right. He then causes the gunner to set his sight cording to the result thus obtained and to lay on the ram staff at the designated piece. This results in the guns being so that the axes of the bores are parallel.

Each chief of section then selects his own aiming point causes the gunner to measure the deflection (**959**).

968. The necessity for taking full advantage of cover for concealment of the guns, especially from aircraft, may so times make it impossible to utilize a common aiming point o see one piece from another. In such cases the executive ca the pieces to be pointed, by the compass or other means nearly as may be in the proper direction. One of the pieces selected to fire a single round of time-shrapnel so as to give burst about 10 mils above the horizon visible from the guns a at as great a range as practicable. The remaining pieces are elevated and the sights are so set as to enable each gunner quick to turn the rotating head of his panoramic sight upon the bur without disturbing the laying of the piece. Each chief of s tion, having noted the deflection, causes the gunner to turn t sight on any suitable aiming point without disturbing the layi The reading on the aiming point selected is then diminished the reading on the burst if this latter reading was less th 3,200. If the reading on the burst was greater than 3,200 t reading on the selected aiming point is increased by the diff ence between the burst setting and 6,400. The deflection o tained by making the corrections just indicated is then set on each sight and each gunner brings his cross hairs on the ai ing point selected by traversing the piece. This results in t

ces all being laid on the point of burst of the shot fired. By table commands for opening the captain forms the sheaf.

969. Having once formed the sheaf, the captain may change direction by announcing a new deflection or by the command: **Right (Left), (So much).** At the command, for example, **ght 30,** each gunner **subtracts** 30 from his deflection, sets his ht at the new deflection, and brings his vertical cross hair on aiming point by traversing the piece. Each gunner has then ved the muzzle of his gun to the **right** through an angle of mils. Similarly, if the command be **Left 30** each gunner s 30.

970. The direction and distribution may be changed simultaneously. At the command, for example, **1. Left 30, 2. On 1st ce, Close 5,** each gunner first adds 30, and then applies the lection difference (**965**). Having set off his correct deflecn, each gunner brings his vertical cross hair on the aiming int by traversing the piece.

971. In order properly to distribute the fire, it is sometimes cessary to change the deflection of a single piece while leavg the others unchanged. The captain commands, for example, uch) **piece, Right (Left), (So much).** The deflection of the signated piece only is changed as indicated in the command.

Section V.—Range and Sight.

972. As the distance from the guns to the target increases guns must be pointed more and more above the line joining gun and the target in order that the projectile may reach target.

973. Since targets are not always at the level of the gun, but frequently above or below this level, the actual inclination the gun to the horizontal when the gun is laid on a target is t the **elevation** due to range of the target only, but is a comnation of this elevation due to range and of the difference level between the target and the gun. When the gunner sets sight shank at the correct range and, looking through the ht, brings the horizontal hair on the bottom of the target he tomatically gives the gun the correct elevation above the line

joining the gun and the target. This elevation of the gun abo
the line from the gun to the target is affected by the range on
and does not vary with the height of the target.

974. When the gunner does not sight directly at the targ
but lays the gun for direction by sighting at an aiming poi
the gun elevation must be given by the quadrant. The quad
rant, therefore, has devices by which the angular elevation d
to range may be set off and by which to make allowance f
the difference in level between the gun and the target.

The first is accomplished by the range disk, the operat
setting the range announced opposite the index.

The second is accomplished by the site device, which t
operator has only to set at the value announced.

The range and site data having been set off on the quadra
and the quadrant being in place on the gun, the operator el
vates or depresses the gun until the bubble of the elevati
level is centered. The proper combination of these two angu
values is thus automatically made and the gun has the pro
inclination to the horizontal to cause the projectile to re
the target.

975. The site is announced by the captain, **Site (So and so)**

Since the guns of a battery are usually on nearly the sam
level the site is usually the same for all the guns. Sometim
however, it becomes necessary to give a different site to th
several guns. In such cases the captain commands: **Site, No. 1
(So and so); No. 2 (So and so);** etc. The gunner of each pie
sets the site indicated for his particular piece.

976. The range is announced for each salvo or volley.

Section VI.—Projectiles, Fuzes, Kinds of Fire.

977. There are two kinds of projectiles for the 3-inch fie
gun: **shell** and **shrapnel.** There are also two kinds of shrapn
common and **high explosive.**

978. The **shell** consists of a steel case with a bursting char
of high explosive which detonates upon striking.

The **common shrapnel** consists of a steel case containing ab
250 bullets and a bursting charge of black powder in the ba

High-explosive shrapnel (H. E. shrapnel) is similar to non shrapnel, except that it contains not only the base ut a high explosive intermingled with the shrapnel This shrapnel is fitted with a fuze that causes the high to detonate upon striking.

er the common or the high-explosive shrapnel bursts e case is not ruptured, but the base charge forces the the shrapnel case and expels the bullets to the front in ral shape of a cone, called the shrapnel cone.

With respect to the instant at which the projectiles e is classified as percussion fire and time fire.

cussion fire the projectile bursts when it strikes; the then said to be on impact.

e fire the projectile bursts in the air before reaching nd.

Bursts on impact are secured by a fuze which explodes ting charge upon striking. Such a fuze is a percussion does not have to be set but is always ready to act projectile is fired.

Bursts in the air are secured by a fuze which can be plode the base charge at any time after the projectile

Such a fuze is a time fuze. It contains a powder hich starts burning at the instant when the projectile and, when the fuze is set, burns down to the base in a period of time dependent on the setting.

For convenience the fuze setter for setting the time graduated in range. But due to errors of the fuze and uses the base charge will not always explode at exactly ge set off. Moreover, it is sometimes necessary to vary ght of burst. For this the fuze setter is arranged to changing the fuze setting without changing the range on the fuze setter. The device for accomplishing this the corrector. A corrector of about 80 ordinarily gives t of burst of about 8 mils as seen from the guns. This of burst is called normal. Raising the corrector shortens t of the time train which must burn before the base is reached and therefore raises the height of burst.

Lowering the corrector lengthens the time of burning and lowers the height of burst.

983. All shells are provided with **percussion** fuzes only.

All shrapnel are provided with **combination** fuzes containing both percussion and time elements. The percussion element acts if the time element has not acted before the projectile strikes. If the combination fuze be set at safety the time element can not act but the percussion element may.

984. The gun squads must know the kind of projectile and the fuze which are to be used. This is indicated to them by the commands: **Shell;** or, **Percussion;** or, **Corrector (So much);** or, **Up (Down) (So much).** The command **shell** indicates that shell are to be used. The command **percussion** indicates that shrapnel for percussion fire are to be used. Since shrapnel for percussion fire must have their fuzes set at safety and since the fuzes are carried at that setting in the chest, it is not necessary to use the fuze setter when the command **percussion** is given; but, as the gun squads must be ready to change from percussion to time fire, No. 3 always sets his range scale at the last range announced.

Corrector (So much); or, **Up (Down) (So much)** indicates time fire with shrapnel and that the fuzes must be set.

SECTION VII.—METHODS OF LAYING.

985. When it is possible for the gunner to see the target clearly and to aim directly upon the part of it which the fire of his gun is intended to reach, the gun may be laid by the gunner for both range and direction. This is called **direct laying.**

986. When it is impracticable for the gunner to aim directly upon the part of the target which the fire of his gun is intended to reach, the gun is laid by him for **direction only.** In this case an aiming point which can be clearly seen by the gunner is designated and a suitable deflection given, such that when the line of sight is directed upon the aiming point, the gun will be directed upon the target. This is called **indirect laying.**

7. For direct laying, the target must be distinctly visible
ugh the sights; the guns must therefore be more or less
sed. For indirect laying the target need not be visible to
gunners; the guns may therefore be concealed. For these
ons and because indirect laying leaves to the captain com-
independence in the manipulation of the sheaf of fire
ordinarily results in great regularity of heights of burst,
es, and distribution, it is the usual method.

8. In firing at aerial targets or at small targets moving
lly, direct laying is advantageous because corrections for
are eliminated and changes in deflection are automatically
by keeping the cross hairs on the target.

firing at large moving targets or at small targets slowly
ng, indirect laying may be used with great facility.

TION VIII.—FIRE FOR ADJUSTMENT; FIRE FOR EFFECT; ACCURACY.

9. It is usually impossible to determine before firing the
t laying which will certainly give hits on the target. It is
fore necessary to correct the laying according to the cap-
s observation of the bursts with reference to the target.
first part of the fire at any target is accordingly conducted
s to facilitate observation. Such fire is called **fire for**
stment.

0. The fire must always be adjusted in direction, in distri-
on, and in range. In time fire the height of burst must
be adjusted.

a rule, the direction, distribution, and height of burst
be quite accurately observed and adjusted by making
ges in the deflection, deflection difference, and corrector.
stment of the range is more difficult. It is usually impos-
to determine a single range which will surely give hits on
target. On this account it is generally best to determine
ranges, one of which gives bursts short of the target and
of which gives bursts beyond the target. The determina-
of these two ranges is called **bracketing** the target. The
rence between the two ranges is called the **bracket.**

991. Having obtained the adjustment, fire is opened at ranges and, in time fire, at a height of burst which will surely give hits on the target. This is called **fire for effect.**

992. The greatest difficulties in obtaining adjustment and the principal cause of lack of effect arise from errors in the fir Such errors are due to inaccuracies of the personnel, to atmos pheric changes, and to imperfections of matériel and ammuni tion. Even though the laying be exact, a single gun will n shoot precisely in the same place each time it is fired.

Inaccuracies due to the personnel are usually much grea than those due to the matériel. They result from errors laying; from failure to set the scales exactly as ordered or center the bubbles; from not noticing and correcting any rangement of the laying due to loading or of the settings d to firing; from not turning the projectile in the fuze setter the proper manner; and from similar mistakes.

993. Rapidity of fire without accuracy is unprofitable. Acc racy slowly obtained must often result in lack of effect, becau the enemy will have time to shelter himself from the fire. T ideal is accuracy with rapidity. This ideal can be attained at first insisting on accuracy without regard to speed and thereafter gradually developing it through persistent drill of th gun squads in the firing battery.

994. It must be realized that all men are likely to make mi takes. In order that the captain may not be misled, all membe of the gun squads should be encouraged to detect and to rep at once any errors that are made. The causes of these sho be sought and reported in order that methods and matér may be so improved as to reduce the number and effect of p sonnel errors.

SECTION IX.—METHODS OF FIRE.

995. The methods of fire are **fire by salvo, volley fire, volle fire sweeping,** and **fire at will.** The use of salvos and volleys habitual and both natures of fire are ordinarily used in fir at each target, particularly in time fire. Volley-fire sweepi is employed during **fire for effect.** Fire at will is exceptiona being used only for the close defense of the guns.

Salvos.

3. The command for a battery salvo is: **Battery right**
. Upon the command **fire** by the executive the pieces are
at the command of the gunners, in order from the right
ervals of about two seconds.

7. The command for a platoon salvo is: **Right right (left),**
ft left (right).

e first word of the command designates the platoon which
fire.

the command be **right right** (left) the first and second
only are loaded. Similarly, if the command be **left left**
t) the third and fourth pieces only are loaded.

e second word of the command indicates the flank from
the pieces designated are to be successively fired. Upon
ommand **fire,** by the executive, the pieces designated are
at the command of their gunners, in the order indicated
interval of about two seconds.

8. The interval of two seconds may be increased by cau-
g, after the command for the salvo, **At (so many) seconds.**
interval thus prescribed will be used as long as salvos are
until another interval is announced.

9. Occasionally it may be desirable to fire each piece at the
ic command of the captain. The captain cautions: **At my**
and. Each piece is then fired upon the command by the
in: **No. (So-and-so) Fire,** each gunner repeating the com-
fire when his piece is designated.

10. In certain cases it may be desirable to fire a single
The captain commands: **(Such) piece only.** The desig-
piece only is loaded and it is fired upon the command **fire**
e executive.

11. When the method of fire is by platoon salvo or by
the gun squads of the pieces which are not to take part
e firing keep all the instruments set and the pieces laid in
dance with the commands. All the guns are thus able to
fire immediately. To change from platoon salvos, or fire
ngle piece, to battery salvos, the command is: **Battery right**

(left). All of the pieces take up the fire in succession from th flank indicated.

1002. Salvos are particularly suitable for fire for adjustme on account of the facility with which the bursts may be o served.

Volley Fire.

1003. The command for battery volleys is: **Battery (S many) rounds.** Upon the command **fire** by the executive, e piece fires the designated number of rounds as rapidly as p sible consistent with accuracy and without regard to the ot pieces. To make certain that the correct number of rounds fired, each No. 4 as he loads the piece calls out the range the number of the round. As the last round ordered is loa he adds: **Last round.** Thus, the command being **Battery rounds, 3200.** On loading the first round, each No. 4 calls **3 One**; on loading the second round, each No. 4 calls **3200, T Last round.**

1004. In exceptional cases it may be desirable to use platoon only in volley fire. In such cases the comman **Right (Left), (So many) rounds.** Only the pieces in the de nated platoon are loaded and fired.

1005. Volley fire is particularly suitable for fire for effect account of the rapidity with which it may be delivered.

Volley-fire sweeping.

1006. The purpose of sweeping is to distribute the fire ov wide front. It consists in changing the direction of each p between shots.

This may be accomplished mechanically by a full turn of traversing handwheel between rounds if there is not mate lost motion in the mechanism. Or, if the reticule of the p oramic sight is provided with a horizontal scale, the line sight may be shifted through an appropriate angle.

1007. The commands for sweeping are: **Battery (So ma rounds, sweeping,** or, **Right (Left), (So many) rounds, sweep** The execution is the same as that of volley fire (**1003–10**

ery respect, except that after the first and each succeeding
d of the sweep the gunner traverses the piece to the left
ne full turn of the traversing handwheel, disregarding
rate laying in direction; or, if the reticule of the sight has
rizontal scale, instead of turning the handwheel he shifts
line of sight 10 mils to the left for ranges up to 2,500 yards,
ls for ranges exceeding 2,500 yards (1876–1880).
soon as the last round of the sweep has been fired, the
er traverses the piece back to the right until the line of
is again on the right of his portion of the target or on the
ng point.

Fire at will.

008. For the very close defense of the guns the command is: arget (So-and-so), 2. FIRE AT WILL. At this command ts are set at deflection zero and range 1000. Fuze setters set at corrector 30 and range zero. Shrapnel only are used. h gun is loaded and laid on the target. Upon the command by the executive, each gun is fired as rapidly as possible l the command cease firing or until the target disappears ctually reaches the gun. In fire at will, the gunner neglects refinements of laying, rapidity in this case being of more ortance than great accuracy.

TION X.—CLASSES OF TARGETS, APPROPRIATE METHODS OF FIRE AND BRACKETS.

009. Targets are classified with reference to their nature as ery, infantry, machine guns, etc. They are also classified rding to their movement, or power to move, as fixed or ionary, transient, and moving. All of these may, of course, y as to size and as to degree of movement.

010. Fixed, or stationary, targets are targets which are d to their position for at least a considerable time. Exles of such targets are buildings, trenches, artillery in posi; troops held under cover by fire.

Transient targets are those which while fully exposed to are likely to remain so for a very brief time. Examples of

such targets are infantry skirmish lines, machine guns, observation parties.

Moving targets are those which are changing their location. Examples of slowly moving targets are large bodies of troops on the march, infantry whether on the march or advancing to the attack, wagon trains on the march. Examples of rapidly moving targets are artillery at fast gaits, charging cavalry, cavalry at fast gaits, small bodies of mounted men, motor cars.

1011. Against all fixed targets salvos are ordinarily used for fire for adjustment, which is usually continued until a suitable bracket has been obtained.

1012. Against transient targets it is necessary to be content with a wider bracket. In extreme cases it may be desirable to assume a bracket of considerable depth based on the observation of the first bursts. Transient targets are usually attacked with shrapnel. Salvos are usually appropriate during fire for adjustment. Volleys are used in fire for effect.

1013. Slowly moving targets or long targets moving across the line of fire are attacked by shrapnel in the same manner as fixed targets. Either direct or indirect laying may be used. During direct laying volleys are usual during adjustment as this method gives the gunner more independence in the instant of firing, and he is better able to take advantage of *the moment* when the target is most visible and his laying most accurate. Volleys are used in fire for effect.

1014. Rapidly moving targets or small moving targets are attacked by shrapnel in the same manner as in the extreme case of transient targets. Volleys are ordinarily used both in and for adjustment and in fire for effect. If the target is small indirect laying is usually ineffective.

1015. When the target is moving across the line of fire and the trail has to be shifted, the gunner traverses the muzzle of the gun as far as it will go in the direction opposed to that in which the target is moving. This enables him to take advantage of the greatest possible amount of traverse on the carriage. In shifting the trail No. 2 sights along the gun and directs it on the head of the target.

TION XI.—FIRING DATA AND THEIR COMMUNICATION TO THE GUN SQUADS.

016. **The firing data** embrace all the information and comds necessary to enable the gun squads to accomplish the rly, rapid, and accurate service of the pieces. To this it is essential that the firing data be communicated to the s in an habitual sequence. First place must be given to element of the data most essential to commencing the servf the pieces. The sequence should favor as far as possible completion of one operation by a particular member of the squad before he is required to take the data for another.

017. The necessary data for indirect laying in their habitual ence are—

The designation of the aiming point.
The deflection.
. The deflection difference.
. The site.
. The kind of projectile (corrector, shell, or percussion ipnel).
The method of fire.
The range.
The command, by the executive, fire.

018. The necessary data for direct laying in their habitual ience are—

The designation of the target.
The deflection.
The kind of projectile (corrector, shell, or percussion).
The method of fire.
The range.
The command, by the executive, fire.

019. Fire at will being an exceptional and special method, which the sight and the fuse setter have fixed settings 08), and direct laying with shrapnel is always used, the firing data necessary are the designation of the target, the hod of fire, and the command **fire.**

020. It is generally possible to communicate certain items he data before the moment for opening fire. For example, in

indirect laying the aiming point may be designated and the approximate deflection and the deflection difference announced as soon as the guns are established.

1021. Except when the captain is near enough to the battery to make his voice heard by all the gun squads, the executive repeats all the firing data. Without awaiting any signal or command from the captain, the executive gives the command **fire** at such time after the range is announced as will insure the orderly delivery of the fire. If the captain desires to give the range without opening fire, he cautions **Do not load** before announcing the range. To load and fire he again announces the range. To suspend the fire at any time the captain commands or signals: **Cease firing.** The firing is stopped and all of the pieces are unloaded but are kept laid with the last data received. The signal for cease firing is a prolonged blast on the whistle with the right arm raised vertically until the signal is obeyed.

1022. Each gunner gives the command **fire** so that his piece will be fired at the proper time after the command **fire** by the executive. No other item of the firing data is repeated unless it is called for. When a member of a gun squad does not understand any item of the firing data he asks his chief of section for it, thus, **Site? Corrector?** etc. **(950).**

1023. The complete firing data **(1015–1018)** are always necessary before firing the first salvo or volley after occupying a position. After the first salvo or volley the captain announces only so much of the data as he desires to change, except that the range is always given as a definite signal to load and for the executive to give the command **fire** at the proper time.

In firing shell or percussion shrapnel each piece is loaded as soon as it is fired; but the range is nevertheless given as a definite signal for the executive to give the command fire at the proper time.

1024. In the exceptional cases in which the captain causes each piece to fire at his command, the executive repeats the command: **No. (So and so) Fire,** unless the captain is near enough to the guns to make his voice heard by all the gun squads. Each gunner cautions **fire** at the proper time.

TION XII.—COMBINED DUTIES OF THE MEMBERS OF THE GUN SQUADS.

025. The duties of individuals in the gun squad are not in-ɔendent but are closely related. Team work is essential to ɔidity and accuracy of fire and, therefore, to its effectiveness. ɔh man must exactly perform his functions without inter-ng with other men. Each must cooperate with and assist the ers in every practicable way.

026. To attain a high quality of teamwork the most neces-y requisite is a profound knowledge by each man of his own ctions and facility in executing them at high speed, rein-ɔed by a thorough understanding of the duties of each of the er members of the gun squad.

027. In the first combined drills it is advisable to explain ɹctly what each man does after the announcement of each ɯm of the firing data. After this explanation the men should required to perform their duties precisely but slowly. As ɔ instruction progresses, they are urged toward greater ɔidity without sacrifice of precision. When the squads are ɹrking smoothly as units, the explanations are omitted. nally the firing data are announced with as great rapidity as consistent with distinct enunciation.

1028. In indirect laying it is not necessary for the gunner to t the range exactly. During direct laying the exact setting the sight for range is essential. Rapidity on the part of the nner in traversing the piece to the center of its traverse when ɔ trail is to be shifted in indirect laying facilitates the work the chief of section. Similarly, for direct laying at moving gets the work of No. 2 is greatly facilitated if the gunner, en the trail must be shifted, rapidly traverses the gun as far it will go in the direction opposed to that in which the target moving. The gunner must not interfere with the elevating chanism in indirect laying.

1029. No. 1 helps No. 4 by opening the breech before the n has returned into battery and by seeing that the block mains fully away from the breech. No. 1 must not interfere th the elevating mechanism during direct laying.

1030. As soon as the battery goes into position prepared f action, No. 5 inserts a round of shrapnel in the fuze setter a sets the fuze; thereafter ,he inserts another round and sets t fuze as soon as the fuze setter is empty. Whatever the kind fire, he always has, during firing, a round of ammunition in h hands ready, in the case of time fire, to insert it in the fu setter and set the fuze, or, in the case of percussion fire, to p it directly to No. 4. No. 4, in percussion fire, loads the pi immediately after the breech has been opened. To this end, soon as he has taken a round of ammunition from No. 5, stands at the breech ready to load as soon as it has been open He takes care that no part of his body shall be in the way the gun during recoil. In volley fire with time shrapnel, wh more than one round is to be fired, No. 4, after giving the fi setting to the fuze, stands ready as in percussion fire to l each round after the first.

1031. Whenever No. 2 requires assistance in shifting t trail, the chief of section designates the cannoneers who ar assist and the places at which they are to work.

1032. The gunner and all cannoneers who have scales to s verify their readings immediately after each shot. The gunn and No. 1 also immediately relay the piece with the settings the previous round unless new data are received before the have time to do so.

CHAPTER V.—REPLACEMENT OF AMMUNITION AND C CASUALTIES.

1033. The ammunition chests of the firing battery sho always be kept as nearly filled as practicable. If it is probab that the position will be occupied for a considerable time, add tional ammunition may be brought up and stored at suitab places near the guns.

1034. The ammunition in the caissons of the gun sections ordinarily replenished from such ammunition as may be stor near the guns and from the caissons of the 5th section.

ıen the battery is not under fire this replenishment should ore or less continuous and may be carried on by Nos. 6 7 under the immediate supervision of the chief mechanic. ı the battery is under fire, or for other reasons, it may be ssary to take advantage of lulls in the action and to utilize he cannoneers in drawing ammunition from that stored or e 5th section caissons.

35. Ammunition may also be drawn from the limbers of iring battery. This method is, however, only resorted to ıergencies when the caissons of the combat train are tem- ily not available.

36. The resupply of ammunition to the firing battery is lly carried out by the combat train. The caissons from the at train may be brought up, unlimbered, and the empty ons of the firing battery (except the caisson of the 5th sec- which carries the observation ladder) replaced with filled sons. The empty caissons are then taken to the rear. Or, ammunition may be taken from the caissons which are ght up and transferred to the caissons of the firing battery) a suitable place of storage.

ı either case it is usually desirable to take the ammunition ı such limbers as are brought up, so as to avoid sending ammunition to the rear.

37. The exact method to be used in the resupply of ammu- on to the firing battery depends upon the circumstances of case. As a rule such situations as render it probable that position will be occupied for a considerable time justify the mulation of considerable supplies of ammunition in suitable es near the guns. In such cases the caissons from the com- train may be brought up whenever conditions permit and ammunition transferred to the supply stored on the ground ı some improvised place.

ı the other hand, conditions which make it probable that position must soon be changed may require the exchange of sons and may even make it desirable not to withdraw the munition from the limbers of the filled caissons which are ught up.

1038. Whatever the method of resupplying the firing batt from the combat train, it is desirable to use all of the m available in making the transfer so that the teams and empty carriages may be removed from the vicinity of the g as rapidly as possible. No fixed rule can be given for the ployment of the men in this transfer. The executive gives necessary orders for the rapid and orderly accomplishment the work.

1039. The executive, under the direction of the captain, charge of the replacement of casualties. Every effort must made to prevent the personnel with any piece in action f falling below a strength of 2 noncommissioned officers an privates.

1040. As a rule each casualty in officers and noncom sioned officers is replaced by the next junior available in unit or subunit.

The captain is temporarily replaced by the senior office noncommissioned officer at his station, who takes over the d of the captain, continues the action of the battery and no the senior officer of the casualty at the first opportunity.

Gunners and Nos. 1 and 3 are replaced by the best instruc men available.

1041. When the casualties in any gun section reduce t number of privates below five, additional duties until substitut can be obtained from the combat train are performed as fo lows:

Cannoneers retained.	Distribution of duties.				
	G	1	2	3	
G, 1, 2, 3, 4	G	1	2	3	
G, 1, 2, 3	G	1	2, 4, 5	3	
G, 1, 2	G	1	2, 3, 4, 5		
G, 1	G, 1	2, 3, 4, 5			

1042. In action, if casualties become excessive, the service one or more guns may be temporarily discontinued and t cannoneers sent to assist at other places, so as to have

ble, a gunner and two men for the service of each piece as a piece may be loaded, but, not less than one man. The of the battery must not cease as long as there are men to any of its guns.

43. In order to accustom the personnel of the firing bat to replacing casualties and to keeping the guns well s ced number of men, the captain frequently designates ind als who are to fall out. This training should not however gun until the instruction of the personnel is well advanced.

CHAPTER VI—FIELD FIRING.

SECTION I—DEFINITIONS.

44. **Angle of departure:** The angle between the plane of and the line of departure.

ngle of fall: The angle between the plane of site and the gent to the trajectory at the point of fall.

ngle of incidence: The angle between the plane of the surf struck and the tangent to the trajectory at the point of act.

urst center, center of burst, or mean point of burst: The nt about which the points of burst of several projectiles are ally distributed.

urst interval: The distance in the plane of site from the nt of burst to the target.

urst range: The distance from the muzzle of the gun to the nt of burst.

unter slope: A slope which descends toward the enemy and wholly or partially hidden from him by the covering crest the reverse slope.

est: The summit of a ridge.

rved fire: Fire with low muzzle velocity, the elevation not eeding 540 mils.

anger space: The distance, in the plane of the slope consid l, over which an object of a given height would be struck.

flection: The angle between two vertical planes containing the line of sight, and the other the axis of the bore.

Deflection center: The point about which bursts in air or impact are evenly distributed in direction.

Direct fire: Fire with high muzzle velocity, the elevation not exceeding 360 mils.

Direct laying: Pointing the gun for direction and elevation by directing the line of sight upon the target.

Drift: The departure of the projectile from the plane of fire due to its rotation and to the resistance of the air.

Elevation: The angle between the plane of site and the axis of the bore when the gun is laid.

Height of burst: (1) The vertical angle between the plane of site and a right line joining the muzzle of the gun and the point of burst. (2) The ordinate of a point of burst.

Height of burst center: The point about which bursts in air are evenly distributed in height.

High angle fire: Fire with elevation exceeding 540 mils.

Indirect laying: Pointing the gun for direction by directing the line of sight upon an objective other than the target, and for elevation by the use of a quadrant or elevation level.

Jump: The angle between the line of departure and the axis of the bore before firing; hence, the difference between the elevation and the angle of departure.

Line of departure: The prolongation of the axis of *the bore* at the instant the projectile leaves the gun.

Line of sight: The right line passing through the sights and the target or the aiming point.

Mean height of burst: (1) The height of the burst center. (2) The average of several heights of bursts.

Mil: The unit of angular measure, one sixty-four-hundredth of a circle. The arc which subtends a mil at the center of a circle is, for practical purposes, equal to one one-thousandth of the radius. The arc and its tangent are nearly equal for angles not greater than 330 mils.

Military crest: The line nearest a crest from which all the ground toward the enemy may be seen and reached by fire.

Muzzle velocity: The velocity of the projectile at the instant it leaves the bore. Velocities are measured along the tan-

the trajectory at the point considered and are expressed in
t per second.

Normal corrector: The corrector setting which gives a normal
ght.

Normal height: The height of burst giving the maximum
ect from a projectile.

Ordinate: The distance of a point of the trajectory from the
ne of site. The **maximum ordinate** is the ordinate of the high-
point of the trajectory.

Parallax: The angle at any point subtended by any given line.

Plane of fire: The vertical plane through the line of depar-
e; also called *plane of departure.*

Plane of site: A plane containing the right line from the
zzle of the gun to the target, and a horizontal line perpendicu-
to the axis of the bore at the muzzle.

Point of burst: The point at which a projectile bursts in the
: or at which it would have burst in the air had it not struck
e ground.

Point of fall, of impact, or of graze: The point where the pro-
ctile strikes.

Probable error: The amount of error that, in a large number
: occurrences, will be as often exceeded as not.

Quadrant angle of departure: The angle between a horizontal
ane and the line of departure.

Quadrant elevation: The angle between a horizontal plane
id the axis of the bore when the gun is laid.

Range: The distance from the muzzle of the gun to the
rget.

Range center, center of impact, or mean point of fall: The
int about which the points of fall, reduced to the plane of site,
e evenly distributed.

Range of burst center: The point about which bursts in air
e evenly distributed in range.

Site: The angle between a horizontal plane and a right line
ining the muzzle of the gun and the target; called also the
ngle of position. The origin of site scales is taken at 300.

Trajectory: The path described by the projectile in its flight.

Remaining velocity: The velocity of the projectile at a point of the trajectory.

Reverse slope: The slope which, from the direction of enemy, is hidden by a ridge of which the slope is a part.

Terminal or striking velocity: The remaining velocity at point of burst or point of fall.

Time of flight: The time in seconds required for the projec to travel from the muzzle of the gun to any point of the traj tory—usually to the point of fall or of burst.

SECTION II.—THE TRAJECTORY.

1045. The relation between the elements of the trajectory influenced by the muzzle velocity of the projectile, by the an of departure, and as soon as the projectile has left the bore, the force of gravity, the resistance of the air and the rotation the projectile around its axis.

If the force of gravity, the resistance of the air, and the r tion of the projectile around its axis could be eliminated, projectile would describe a straight line and its velocity wo remain constant. If the projectile be supposed to be influenc only by its velocity, the angle of departure, and the force gravity, it can easily be shown that it would describe a curv the highest point of which would be the center of the trajectory and that both halves of the trajectory would be identical shape. But the resistance of the air acts to reduce the velocity of the projectile from the instant it leaves the muzzle, and co sequently influences the path which it describes, so that reality the highest point of the trajectory is nearer to the end, and the two parts of the trajectory are unequal and symmetrical.

In order to force the projectile to travel along its trajecto with its point foremost, a rotary motion is imparted to it the rifling in the gun.

1046. When the target and the gun are in the same horizonta plane, the proper elevation for the gun is the range-table el vation.

hen they are not in the same horizontal plane, the proper ation for the gun is the range-table elevation plus or minus site. The site is additive if the target is higher than the subtractive if it is lower.

47. When direct laying is used, the site is automatically n into account, as the line of sight is directed on the target. he other hand, when the elevation is given by the quadrant ust be increased or diminished by the site, so as to bring trajectory on the target.

48. The remaining velocity decreases as the range in- ses.

49. The time of flight increases more rapidly than the e.

50. The drift increases more rapidly than the range. By easing the deflection by the amount of drift for any range axis of the bore may be pointed as far to the left of the get as the shot would drift to the right.

051. The fuze of the shrapnel permits its use for either ussion or time fire. In time fire, under normal atmospheric litions, the fuze should cause explosion at a determined t interval.

052. When the time train burns too slowly, low points of t, bursts below the target, or explosions on impact are ob- ed. When it burns too quickly, high points of burst are ined.

053. When a shrapnel explodes in the air the bullets are lled from the case to the front, their paths, taken collec- y, assuming the general shape of a cone, called the **cone of e-sion**, the apex of which is the point of burst, the axis ciding approximately with the continuation of the trajec-

he angle between the two lines cut from the surface of the of dispersion by a plane passing through its axis is called **angle of opening.**

he angle of opening depends upon the relation between the city of rotation and the remaining velocity.

Manipulation of the trajectory in the plane of fire.

1054. In the course of firing, the captain will be constrain to utilize the relations existing between the elevation, the si and the corrector, which are the following:

The location of the trajectory in the vertical plane depen upon the site and the elevation. It may be changed by chan ing one or the other of these elements, or the same locati may be retained by making the proper changes of both in op site senses.

A variation of the site affects the range the same as an eq variation of the elevation.

The height of burst under normal conditions depends only the site and the corrector.

If the site only is varied, the point of burst is displaced height, but not in range; if the corrector only is varied the po of burst is displaced at the same time in both height and ran Simultaneous and equal but opposite changes of site and c rector cause no change in height of burst, but the burst r changes.

The burst range depends only on the fuze setter range a corrector settings. It is increased or diminished by increasi or diminishing the fuze setter range or by lowering or raisi the corrector.

The point of burst of two or more rounds are not coincide unless these three elements remain constant, or unless all thr change at the same time by suitable amounts and in the prop relation.

The differences in range shown in the range tables as co sponding to given variations of elevation are measured in plane of site. On slopes greater than the plane of site, such a counter slope, the difference in ranges to points of fall will b less than that in the tables. On terrain inclined in the opp site sense, such as a reverse slope, the difference in ranges points of fall will be greater than that in the tables.

Section III—General Provisions.

1055. To render effective assistance to other arms upon th battle field, field artillery must be able to deliver a timely an

rpowering fire upon any designated part of the enemy's ition.

056. The battery is the fire unit.

057. Those areas of the hostile position within which fire to be delivered by particular artillery units are called **sectors.** ey are usually described by reference to prominent points of terrain, right lines to which, from the observing station of commander of the artillery unit considered, limit the area igned. Within, and sometimes outside, the sectors assigned, must be delivered upon objectives called **targets.**

058. The tactical command of one or more fire units with a w of bringing their fire to bear upon a suitable position on the proper targets at the appropriate time is called fire ection.

1059. The dispositions that must be made and the technical terminations of the data necessary before opening fire con- itute **preparation of fire.**

1060. Conduct of fire consists in employing the technical eans necessary to cause fire of the desired nature to be brought bear upon the target.

1061. The officer charged with the conduct of fire must be the aster of the fire of his guns. He must be able to turn the e promptly upon any target at will and to regulate its tensity and distribution as circumstances require. The attain- ent of this condition requires on the part of the officer com- ete familiarity with the weapons at his disposal and skill id quick decision in their use, and on the part of the organiza- on thorough knowledge of the matériel, uniform and reliable rvice of the piece, cooperation of all parts, and strict fire scipline.

1062. Accurate and skillful cooperation of several batteries ider a single command is the foundation of proper fire rection.

1063. Owing to inaccuracies in the determination of firing ita, to the influence of weather conditions, to errors made in e service of the guns, and to imperfections in matériel and nmunition, fire must be delivered and, on the basis of obser-

vations, corrected to insure effectiveness upon the target. D
ing such fire effect is desirable. Fire of this nature is ca
fire for adjustment.

When fire has been thus adjusted it must be continued, of
with changed data, to secure effect. During such fire contin
observation is necessary. Fire of this nature is called fire f
effect.

SECTION IV—POSITIONS.

1064. Artillery may be posted for **immediate action, in ob
vation,** or **in readiness.**

When posted for **immediate action** the guns are unlimbe
and fire is opened as promptly as possible upon the indic
targets.

When posted **in observation** the guns are **unlimbered** and
preparations made for opening fire at the desired moment u
the existing or expected targets.

When posted **in readiness** the guns are not **unlimbered.**
are held under cover near a position for possible imme
action, but so that they can be moved quickly to another *locat*
if the development of the tactical situation so requires.
the meantime the immediate tactical situation is studied, po
tions in the neighborhood for posting the guns to meet *differe*
eventualities are selected, and preparations are made for occ
pying the selected positions and for promptly opening fire up
the existing or expected targets.

1065. Positions are defined as **masked** or **in the open,** acc
ing as they afford concealment from the hostile position or

When no concealment is afforded the guns are said to be
the open.

When concealment is afforded, the guns are said to be u
cover or in a **masked position,** and the fire is referred to
masked fire.

The degree of concealment varies. Thus:

(*a*) If the guns are posted so that through the sights
hostile position can be seen over the mask, they are said to
in the open.

b) If where a dismounted man can just see the hostile ition over the mask, they are said to have **dismounted** lade.

c) If where a mounted man can just see the hostile position r the mask, to have **mounted defilade.**

d) If so that the flash of the gun will be concealed from the tile position, to have **flash defilade.**

'ositions are described by the foregoing terms.

066. The hostile position against which defilade is taken y be the target to be attacked; preferably, however, defilade aken against the highest position from which enemy parties effectually observe.

067. A defilade of 4 yards is sufficient to conceal the flash the gun by day. A defilade greater than this is still referred however, as **flash defilade.**

'omplete concealment is obtained only in positions having sh defilade.

1068. The captain of a battery acting alone usually has great itude in choosing the position for his battery.

In battalion the choice of a battery position is limited by battalion commander, who must consider neighboring batries and many other conditions.

1069. By whomever it may be chosen, the position of the ns should conform to certain conditions whose requirements e frequently contradictory.

First. The battery should be able to fulfill its tactical mison; that is, it must be able to fire effectively upon its targets.

Second. It should be as little exposed as possible to hostile servation or fire.

Third. The facilities for command of the battery should be ch as will insure the rapidity of fire demanded by the tactical uation and the nature of the targets.

1070. Indirect laying permits the conduct of fire from a disnce. The difficulty of transforming information at the locaon of the officers conducting fire for application at the guns creases more or less with the distance and direction of sepation and with the difference of altitude. The difficulty of ansmission of information also increases with the distance.

SECTION V.—DUTIES OF OFFICERS.

1071. Due to the extensive use of cover brought about the efficiency of modern firearms, the targets of artillery certain to be concealed from view a greater part of the ti and likely, when visible, to remain so but a short time. find out where the enemy is, to determine definitely the lo tion and nature of hostile bodies, and to secure the informati which will enable the guns to open prompt and effective have hence become duties of the first importance. **Before commencement of the action and through all its phases** information must be sought. Preparation must be made on tactical side for posting the guns where they will be m effective, and on the technical side for securing the data wh will permit fire to be opened promptly on all the positions wh the enemy is known or expected to occupy.

1072. The commander of the troops determines the object the action, fixes the extent of Artillery support to be furni the larger units, and indicates important objectives for s attack.

The distribution of objectives and the determination of t way in which the Artillery is to attack them are the provin of the Artillery commander.

1073. At the beginning of the action the Artillery brigad commander, knowing the objective of the Infantry, what troo are designated to attack these objectives, and the degree of s port for the different attacks, distributes the Artillery at disposal so as best to accomplish the desired results. He de nates the organizations that are to support a particular at and those that are to be held in observation or in readiness meet the developments of the action. He makes clear to subordinates the mission that each is to accomplish. As combat progresses he keeps himself informed of the progress the different attacks and if necessary modifies his initial orde He keeps his subordinates informed, as far as possible, of t situation and of changes in the general plan.

074. The regimental commander causes his unit to take
ition and assigns sectors to the battalions in accordance with
orders he has received. He keeps himself constantly in-
med as to the dispositions both of the enemy and of the
ops with which his regiment is cooperating. He takes steps
insure an adequate supply of ammunition. In certain cases,
for example, when it may be necessary to concentrate the
of his entire regiment against a comparatively narrow front,
regimental commander may have to direct the fire in detail.
general, however, he indicates the portions of the enemy's
upon which fire is to be delivered, leaving the details of
direction to his battalion commanders.

075. The battalion commander directs the fire by assigning
gets to the batteries and by furnishing them such information
l data as will tend to increase the efficiency of their fire. To
is end he transmits to them such information concerning the
ture of their targets, ranges, conformation of the ground in
e vicinity of the objectives, etc., as may become available from
aps, reports, and orders received, from his personal recon-
issances, or any other source.

The battalion commander must keep himself constantly in-
rmed as to the effect of the fire.

1076. The battalion commander designates targets and as-
ires himself that they are identified. Technical details are
rdinarily left to battery commanders.

1077. Sudden changes in the tactical situation may cause
e battalion commander to take under the fire of his batteries
rgets not originally assigned to his unit. He will at once
port the fact to his immediate superior.

1078. Within the battalion changes of objectives are usually
dered by its commander and communicated to all batteries con-
rned, but a battery commander may order change of objective,
his own responsibility, for the support of troops in a critical
tuation, or when necessary for the close defense of his guns,
porting his action as soon as practicable to his immediate
perior. As such cases usually necessitate fresh adjustment,
volving loss of time, the targets should not be changed except

in emergencies until the results sought against the former tar have been fully attained.

1079. When communication is broken between a battery co mander and his battalion commmander the former will t over the duties of fire direction.

1080. It is the duty of all commanders to transmit to offic conducting fire all available information which would assist adjusting the fire or in increasing its effect. It is the duty all newly arriving units to seek information of this charac from units already in action, and it is the duty of all offic having this information to furnish it.

1081. Fire direction is the function of battalion commande who exercise it in detail by assigning targets to particular b teries, and of higher Field Artillery commanders, who usu exercise it by assigning sectors to battalions.

1082. Conduct of fire is the function of battery commande

1083. In the general case the Field Artillery commanders s sign duties to their subordinates, specifying clearly and as s cinctly as possible the tasks to be accomplished by each; t exercise supervision over the supply and expenditure of amm nition, giving such special directions as may be necessary t insure the same being used to the best advantage to meet th requirements of the various phases of the action; *they* assi their subordinate commanders by keeping them supplied wit all attainable information which will aid in the adjustment o employment of fire; but they refrain from interfering in th details of conduct of fire or the service of the guns, interposi only when it is perfectly obvious to them, after careful obser tion of the fire, that the target is misunderstood or that t desired results are not being attained.

1084. Cases may exceptionally arise where it will be nece sary for the higher Field Artillery commanders to conduct th fire of a part of their commands. Suitable tactical dispositio should be sought to avoid such cases, which are most likely t occur in close country where targets visible to the higher co manders may not be visible from the stations of subordinat commanders.

85. The higher Artillery commanders are concerned espey—

To procure by all possible means definite information as to osition of hostile bodies, or as to the positions liable to be pied by them.

To select positions or areas to be occupied by the different s of Artillery and to cause reconnoissance officers to deter- the necessary firing data for these positions.

To assign each unit its particular duty or task, designating, appropriate, those units for **immediate action** and those to position **in observation** or **in readiness.**

To formulate clearly in their minds the terms or methods h they will employ in the designation of objectives (tar- aiming points, registration marks, etc.).

To provide each subordinate commander and to keep him ided with all available information, technical and tactical, ch will assist him in the performance of his duties.

or this purpose, to organize the service of information and munication so that information as to positions and move- ts of the enemy and of our own troops may, on the one hand, uickly obtained and, on the other, be quickly transmitted.

To organize and maintain the service of ammunition and r supplies.

86. Battery commanders are concerned especially—

To select suitable observing stations for themselves and ost auxiliary observing parties, if practicable, so that they assist in the observation of fire.

To examine the target assigned and endeavor to determine rly its nature, its extent, and its relation to surrounding cts.

To study the terrain in the neighborhood of the target; te, if possible, any ravines, hollows, or obstructions which ld hide the fall of projectiles, and decide whether it will ecessary or preferable to adjust the fire upon some particu- part of the target rather than upon the whole front.

To measure the front to be attacked and decide upon the hod of distributing the fire.

5. To decide upon the method of laying, selecting an aiming point if indirect laying is to be used.

6. To determine the initial firing data, if they have not been furnished by the battalion commander or reconnoissance officer or from other sources.

7. To decide whether the adjustment is to be by time or percussion fire, and whether by platoon or by battery.

1087. The executive establishes his station near the guns, at a location from which he can most readily exercise his functions and communicate with the station of the battery commander.

1088. The time available for the performance of the foregoing duties depends entirely upon the nature of the action. In some cases they must be performed with the utmost celerity; in others the opportunity is afforded for deliberate and complete preparation before opening fire. **Every effort must be made to reach the position in advance of the moment for action, and thus gain the opportunity to appreciate the situation and make the necessary dispositions for the prompt opening of effective fire.**

SECTION VI.—OBSERVING STATIONS.

1089. The officer conducting the fire should choose his observing station so that he can see all of his sector *and as much* as possible of the adjoining terrain.

To facilitate the transmission of orders and the proper exercise of command the station should be as near the guns as the conditions permit. This may often be accomplished by using elevated observing stations, such as trees, buildings, etc., or specially prepared ladder or tower.

When the observer is in immediate proximity to the guns it is usually necessary for him to take post on their windward flank in order that his view may not be cut off by dust and smoke and that his voice may carry more certainly.

1090. The commander of an isolated battery frequently has a wide latitude in the selection of his observing station. Because the proximity of other batteries, the advantage of flash defilade and of withdrawing the guns from their mask to reduce the chance of their being reached by searching fire, and the con-

ing necessity of observation of the sector may impose a sta- remote from the guns. In such a case reliable communi- on must be established and maintained.

091. If the station is in immediate proximity to the guns is apt to be subjected to the enemy's searching fire, suitable tection from hostile fire should, whenever possible, be pro- ed for the observing officer.

092. Battalion commanders should seek observing stations n which they can both surely see the terrain assigned to ir units and communicate quickly and certainly with their tery commanders without complicating the communication he latter with their batteries. The most favorable situation ne near to and between two of the batteries where the tions of the major and two captains may be closely asso- ted.

093. Auxiliary observers may frequently be used with ad- ntage at stations near the targets or at a considerable dis- ce to a flank of the line of fire. Elevated stations are par- ularly favorable. In the selection of such stations the most portant requirements are a plain view of the target and its joining area, cover from hostile discovery, and sure and ift communication with the stations to which they are xiliary.

Observers close to the target should preferably be established m battery personnel. Except when a battery is acting alone, nk observers will ordinarily be supplied by the battalion mmander. Flank observers who are intended to assist in justment of fire should be in visual communication with the it from which they are sent out.

1094. Auxiliary observing stations are also established in ptive balloons and in mobile aircraft.

SECTION VII.—COMMUNICATIONS.

Methods.

1095. The best means of communication is the voice, using e megaphone if necessary, but frequently communication must by telephone, by buzzer, by signals, by relays of men for ice transmission, by courier. The whistle also may be used.

1096. Alternative means of communication should habitu be established.

1097. Each battery, each battalion headquarters, and e regimental headquarters is provided with suitable appara for signaling and for electrical communication.

The available matériel must be employed according to a fi ible scheme, and each case must be solved according to t particular necessities.

1098. Frequently the higher commanders will find it c venient to post themselves near one or more of their su dinates and communicate with them by word of mouth or couriers. The matériel and personnel thus freed from o use may be utilized in establishing communication with a iary observing stations, ammunition trains, or reconnaiss officers and scouts accompanying other troops.

Battery Communication.

1099. The battery signalers comprise a corporal, desig **telephone corporal**, and two privates designated as **operator 1** and **operator No. 2.**

1100. The telephone corporal is in immediate charge of a responsible for all the signal equipment of the battery.

He makes such tests and repairs as he may be authorized t make, and reports all trouble which he can not remedy to t captain personally at the first opportunity.

He is responsible that the kind of communication requi is established quickly and effectively.

He reports to the captain when communication is establi with the guns and with the battalion commander. Simil he reports any break occurring in the line of communicatio

He acts as operator at the battery station on the line to battalion station.

When available he assists in relaying commands by voice.

1101. Whenever the battalion line is laid near a battery serving station the telephone corporal habitually establis communication over it with the battalion station.

102. Operator No. 1 assists in establishing the kind of communication required.

He reports to the executive when communication is established. Similarly he reports any break occurring.

He acts as operator at the station of the executive.

He is assisted by scout No. 1.

103. Operator No. 2 assists in establishing the kind of communication required.

He reports to the telephone corporal or to the captain when communication is established. Similarly he reports any break occurring.

He acts as operator at the battery commander's station on the battery line.

104. When signal or wire communication with the battalion station is unnecessary, the operators may be employed for communication with auxiliary observers, with scouts, or with other units.

Battalion Communication.

105. Battalion communication is established and maintained by a sergeant major, a signal corporal, a signal private, an agent from each battery, and the battalion musician.

106. The sergeant major supervises the maintenance of all the signal equipment of the battalion.

During the reconnaissance of the position he receives the battalion commander's instructions as to the kind of communication required and supervises its establishment.

If communication by wire is to be established, he examines the ground, selects the route for the line to follow, and causes the reel cart to lay the wire.

He is in general charge of all messages received or sent by the signals, or agents at the battalion station.

He assists in sending and receiving messages.

107. Whenever the regimental line is laid near a battalion observing station the battalion sergeant major habitually establishes communication over it with the regimental station.

108. The signal corporal is in immediate charge of and responsible for all the signal equipment of the battalion.

He makes such tests and repairs as he may be authorized to make and reports all trouble which he can not remedy to the adjutant personally at the first opportunity.

Under the direction of the sergeant major he establishes the kind of communication required.

He reports to the adjutant or the battalion commander when communication is established with the batteries. Similarly, he reports any break occurring.

He acts as operator at the battalion station on the line to the batteries.

1109. The signal private assists the signal corporal in the maintenance of the signal equipment and the establishment of communication.

He reports to the adjutant or major the establishment of communication with the regimental station. Similarly, he reports any break occurring.

He acts as operator at the battalion station on the line to the regimental station.

When not otherwise engaged he acts as recorder for the signal corporal.

1110. Agents carry messages to the various elements of the command.

1111. The battalion musician, when not otherwise engaged, assists the sergeant major at the battalion station.

1112. Signal equipment and personnel not required for signal or wire communication with the batteries may be employed in communication with auxiliary observers, with scouts, or with other units.

1113. The wire may usually be most conveniently and rapidly laid by commencing at the battalion station, because the cart must be taken there with the cart. But if time permits, the line is preferably laid so that, at the completion of the task, the reel will be near the battalion station. Wire may thus be kept immediately available for extension of the line.

Regimental Communication.

1114. Signal or wire communication between the regimental commander and his battalion commanders, and between the

l commander and the next higher commander, is estab-
in a manner similar to that in a battalion, corresponding
luals performing similar duties.

Brigade Communication.

5. No special apparatus or operators for signal or wire
unication are provided at brigade headquarters. The
le commander gives such general instructions as may be
ary to insure the maximum utilization of the personnel
atériel available in the lower units.
en the Field Artillery brigade commander directs a regi-
or battalion to furnish a certain line, as, for example, to
t the regiment with brigade headquarters, the designated
urnishes such operators as may be required at brigade
uarters, as well as at other stations on the line to be
ished.

Laying the Wire.

6. The battery telephone corporal attends to stretching
ire and setting up the stations in cases involving the use
battery hand reels.
7. The sergeant major ordinarily accompanies the reel to
sure that it follows the most appropriate route, to see that
different stations the operators are ready and make proper
tion to the line, and to give the line guard such special
ctions as may be necessary to insure the proper placing
rotection of the line.
8. Every precaution must be taken to avoid betraying the
n when laying the wire. To accomplish this it may fre-
y be desirable to cause the reel cart to follow a route
erably in rear of the line which the wire is to occupy
carry the wire by hand to its proper position after the
ing has been completed.
9. It is essential that all wire be so laid as to be as far as
le out of the way of probable movements, either of field
ry, of other troops, or of individuals. The wire is

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llery, of other troops, or of individuals. The wire is

stretched either before or after the posting of the guns, as may be most suitable in the particular case. Whenever practicable it is best to run the wire in front of the line of guns rather than in rear. When the line must be laid on ground which has to be crossed by teams in taking up the position it may be best to wait until the guns have been posted and until the teams have cleared the position before beginning to lay the wire.

1120. For effective wire communication good grounds at the instruments are essential. Moist earth should be sought. In dry earth the most favorable location is one near the roots of grass or brush. A satisfactory ground may be obtained through a rod driven into a growing tree.

Guarding the Line.

1121. It is the duty of all men, knowing the position of a wire and seeing it approached by others who are evidently unaware of its location, to give warning by calling, "Wire!"

1122. As a rule sufficient warning as to the location of a line pertaining to a battery can be given without its being necessary to detail a special line guard. When necessary, however, the executive details one or more men to patrol and guard the line.

1123. The line guard pertaining to a reel cart follows the reel when the wire is being laid, shifts the wire to the side of the road, and takes such other precautions as may be practicable for protecting the wire and minimizing its interference with traffic.

Often the wire may be suspended from trees or posts high enough to permit the passage of mounted men. At road crossings it may be covered with boards or earth.

After the wire is laid the line guard patrols the line, warning individuals who approach it of its location, and making repairs when necessary. The necessary men are detailed from the headquarters detachment or, if no members of such detachments are available at the time, they are temporarily detailed from the battteries.

To Use the Telephone.

4. In speaking into the transmitter the head should be
ı a natural position, the lips about an inch from the trans-
. The transmitter should be held with its face vertical
ıould be protected from the wind.
ı high wind good results may be obtained by pressing the
ıitter against the throat on either side of the windpipe.
a moderate tone of voice and speak slowly and distinctly,
careful not to slur the words or syllables, but to enunciate
; each sound.
er shout or raise the pitch of the voice.
er use the letter "O" for zero; when so used it is often
ɜen for "four."
: digit "9" being often difficult to understand, the word
may be substituted therefor.
it is necessary to repeat, use more care as to distinctness,
lo not raise the voice. A single number not understood
be accentuated by counting up to it and emphasizing it.
if the figure 4 is not understood, say, **FOUR**: one, two,
, **FOUR.**
receiving observe the following rules:
Keep the mind on the message; a person can not receive
ctly when he is thinking of something else.
Keep the receiver close to the ear.
Do not interrupt the sender unless absolutely necessary.
Caution the sender when he is speaking too loudly, not
y enough, or too rapidly.
5. In the service buzzer one good battery placed in posi-
next to the hinge of the battery door will operate the tele-
e element, while two batteries are needed for buzzer com-
cation.
ıen no serviceable tungsten batteries, type A, are avail-
four dry cells of any type may be utilized, as follows:
ove the old tungsten batteries; connect the four dry cells
ries; attach one end cell lead to lug P of induction coil,
ıther end cell lead to the horizontal bar alongside the coil.
operates the buzzer element.

The telephone is operated by connecting the binding post to the connection between the two middle cells.

Use of the Buzzer.

1126. Transmission by buzzer is more accurate than by te phone, but it is slower. It is particularly appropriate wh insulated wire has been injured or when bare wire only available. Its use may be necessitated by noise and inducti rendering the telephone unreliable. Efficiency of buzzer ser ice requires a high state of instruction in the maintenance a use of the instrument.

Tests.

1127. Faults in the line are most surely discovered by cutti in at several points with an extra instrument. They are d to grounding or to breaks.

A bad ground of the line near the instrument is indicated a weakening of the buzzer note when the instrument is co nected to the line, and frequently by a noisy receiver.

A partial ground of the line is indicated by weakness complete failure of telephone transmission, although buzz transmission is possible.

An opening or break in the line is indicated by complete fai ure of telephone transmission, although buzzer transmissi may still be possible.

1128. Instrumental tests are described in paragraphs 710 a 711.

Signaling.

1129. Semaphore signaling is the most rapid visual metho

1130. Under favorable conditions semaphore signals with arms can be read up to 600 yards. In a clear atmosph semaphore signaling with the flags can be read without fi glasses up to 1,200 yards; with glasses, up to 2,000 yards. Sp cial attention must be given to conditions of light and ba ground and to defilade from the enemy.

Voice Relay.

1. A chain of men for relaying by voice may become neces-
But the number of men between the sender and receiver
l not exceed two, as opportunities for error are thus
y increased. In any case such communication will be
and it will be effective only if the men have been trained
duty.

Couriers.

2. Messages by courier should, in general, be written. If
rally, they should be of the simplest character, usually
ing only a single statement.

Whistle.

3. A long blast of the whistle denotes **cease firing.** It is
when the command is likely to be unheard or to be delayed
ching the guns. It must not be used when there is any
ility of its being heard by batteries other than the one
led.

Aircraft.

4. Communication from mobile aircraft is reliable only
radiotelegraphy is used. In the absence of such means
l be necessary to use written or phonographic messages
d to the ground; to the notes of a high-pitched horn at
distances; to colored lights, as from a Very pistol; to
nically projected dots, dashes, or streamers of black
r; to certain evolutions of the aircraft; or to other pre-
ed signals.
aling to mobile aircraft is reliable by means of strips
ite cloth, about 20 yards long and 2 yards wide, fastened
ground in conventional geometrical figures.

5. Communication to and from captive balloons and kites
l be by wire.

SECTION VIII.—PREPARATION OF FIRE.

1136. By skillful preparation of fire the time required secure adjustment may be greatly abridged, and the ability be gained to strike a vulnerable enemy by surprise with which is from the outset effective.

1137. In the preparation of fire the captain usually requ assistance. This is obtained from members of the special tails consisting of the instrument detail, the signal detail, the scout detail.

The instrument detail consists of one instrument serge one range-finder operator (generally a first-class private), one horse holder.

The signal detail consists of one telephone corporal and operators, designated as operator No. 1 and operator No.

The scout detail consists of one corporal and one second-c private in peace and of two corporals in war.

1138. The instrument sergeant is in general charge of instruments and equipment used by the special details.

He is informed at the earliest possible moment as to the s ation, the sector assigned, the location of hostile and friend troops, the reference point, the target, the position of the gu and the aiming point.

He sets up the telescope and the aiming circle, *operates* th latter, and calculates firing data.

He keeps a record of the firing and assists the captain observing the fire and studying the terrain, and in collecti recording, and transmitting data.

1139. The range finder is responsible for the condition, and operation of the range-finding instrument.

He receives the same information as the instrument serge and finds for him the ranges required.

He assists the captain in observation of the fire, the en and the terrain.

1140. Scout No. 2 is informed as early as possible as to situation, the sector assigned, the location of hostile friendly troops, and the target.

prepares such place or panoramic sketches as may be
d.

observes the sector, especially the target, reporting
s in its formation, appearance, and movement, and any
upon it.

nay be assigned to particular duties, such as to observa-
egarding the security of the battery, to observation of
y troops or of hostile bodies other than the target, to
nce of other members of the detail.

1. Other members of the battery commander's detail not
ise engaged may be assigned to duties in connection with
ation of fire and its conduct.

2. Whenever a position is occupied, all practicable steps
e taken to provide protection for the personnel additional
t afforded by the matériel, and shallow trenches will be
ed to facilitate shifting the trails.

3. The data that must usually be communicated to the
before they can fire are:

The aiming point or the target.
The deflection.
The deflection difference.
The site.
The kind of projectile.
The method of fire.
The range.

DESIGNATION OF OBJECTIVES.

4. Objectives must be designated in a prompt, concise, and
takable manner. Officers must exercise themselves in
bing objectives of all kinds, in all available forms of
n, and must accustom those under them to the terms and
ds employed in the description. Practice of this char-
should habitually form a part of firing instruction and
l also be included in the instruction of scouts and agents.

5. Targets and aiming points are most clearly designated
ord of mouth and to a person standing near by. On the
ation of a position the aiming point and the expected tar-

gets should, as far as practicable, be thus pointed out to t officer commanding the guns.

1146. If targets are distinct and clearly defined, they may designated by name, as, for example, "The battery on hill 2 "Cavalry to the right front," etc. If a target is indistin poorly defined, or masked, then an area may be designated attack, the nature of the target being invariably given.

1147. In designating objectives (targets, aiming points, istration marks, areas) the following procedure is appropri especially when the objective is not conspicuous or rea recognized:

Define the **relative position** of the objective by giving approximate direction and distance of the objective and its l tion with respect to a prominent feature of the landscape **reference point.** Then give its important **characteristics,** s as its nature, shape, and color. Sometimes the **site of an obj** tive will simplify its designation.

1148. A reference point should, if practicable, be within sector assigned for attack, preferably near its center.

1149. Directions may be indicated by pointing; by the use military terms, such as **to our left front;** by the use of ima nary hour marks on an artificial horizontal clockface the cen of which is at the position of the speaker, and the *12 o'clo* mark directly to the front of the position or at a reference point by the similar use of a vertical clockface whose center assumed to be at a reference point; by the points of the compa

1150. The location of an objective may sometimes be fixed coordinates.

1151. If the objective is in itself inconspicuous, it is us best to designate first the most prominent object in its gen direction, then to give the angular distance between this re ence point and the real objective, and then to give the dista to and description of the latter.

The usual method of procedure is as follows:

1. Indicate the general direction of the objective.

2. Designate the most prominent object in the direction in cated.

State the angular distance from this auxiliary object to the
tive.
Characterize the objective.
us:
At 2 o'clock horizontal.
At 3,000 yards a large stone house, square, two storied,
a cupola on top.
Five hundred mils to the right of the cupola.
At 2,500 yards a light battery in position in rear of the
orchard.
:
Northwest.
At 5,000 yards two symmetrical hills of the same height.
The left peak the reference point.
At 7 o'clock vertically, a field of brown weeds.
In that field, a machine-gun battery.
r:
The lone tree on Artillery Ridge.
Two hundred yards south and four hundred yards west, a
stretch of road.
Beyond the road, machine guns.

52 If it is necessary to designate objectives to a person at
stance, it is important to remember that objects often
nt very different appearances if viewed from widely sepa-
l positions. For this reason it is desirable to select as
ence points natural features having geographical names,
)jects having no similarity to others near by, or features
ig a uniform outline, and hence presenting the same ap-
ance from whatever angle they are viewed. If a courier is
to transmit such information, he is required to keep the
tive in view as much as possible while passing from one
on to the other.

53. The designation of objectives may be greatly facilitated
ie use of maps or by causing a position or place sketch of
errain to be prepared and copies to be furnished the differ-
subordinate commanders concerned. On such a sketch im-
ant landmarks and military objectives should be named or
bered for ready reference.

Panoramic sketches may be used in a similar manner. I when individuals using such a sketch for identification widely separated, allowance must be made for difference in p of view.

1154. Maps ruled into small rectangles that may be rea described by reference to horizontal and vertical notations the margins are highly useful in the designation of objecti and areas.

Parallax.

1155. The parallax of an objective is the angle at a point the objective subtended by a platoon front, 20 yards, at place. Its value in mils is quickly calculated by dividing by the number of thousands of yards from the place in ques to the objective. Thus, the distance to an objective being 2 yards, its parallax is 7, fractions less than .5 being disregard

In calculating parallax it is sufficiently exact in the u case to take as the divisor the whole number representing number of thousands of yards in range; thus, 3 instead of in the example given.

1156. The parallax of an objective is greatest when the o jective lies on the normal to the middle of the platoon fro considered. As the direction of the objective departs *from thi* normal the parallax decreases until it becomes zero, when th objective is on the line of the platoon front prolonged. This known as the change of parallax due to **obliquity.**

1157. The correction for obliquity may be determined w sufficient accuracy by multiplying the parallax, obtained thro assuming the objective to be on the normal to the platoon fr considered, by .9, .7, .4, and 0.0, when the angular distance the objective from the normal is 400, 800, 1,200, and 1,600 m respectively. By interpolation the multipliers for other o liquities may be obtained.

1158. The parallax of a target is always positive. The par lax of an aiming point in front of the line of guns is positi of one in rear negative.

Aiming Points.

59. The selection of suitable aiming points for indirect lay-
:alls for special attention. The best aiming points are:
Continuously visible through the panoramic sight of each

Easily designated and identified.
At a considerable distance from the guns.
Of narrow width and sharp definition.
Near the normal to the line of guns or near the line of the prolonged.
will frequently be impracticable to select an aiming point
ling all these conditions.

60. The use of the same aiming point by all of the guns of
e unit simplifies both fire direction and conduct of fire.
n time is available before the guns come up it is best to go
ie point where each gun is to be placed and make sure that
aiming point will be visible through the sight from that
t. But a common aiming point is not indispensible.

61. Some object which quickly attracts the eye should be
ted, and, if possible, it should be the only object of its kind
e vicinity, so that doubt, hesitation, and mistakes may not
either in the designation of the aiming point or in finding
ickly after looking away. Inconspicuous aiming points
ld be avoided.

62. Although refinements in calculation of parallax are un-
l for, errors in its computation should be minimized by the
tion of distant aiming points. Usually points more than
yards distant will be found most suitable.

63. Narrowness and sharp definition in an aiming point
uniformity of laying more certain. If a broad aiming
must be chosen, the part of it to be used must be desig-
l. If a tree, its trunk may be designated; if a ledge of
a certain edge; if a building, a certain chimney, peak, or

64. The rate of change in the value of the parallax within
nils of the position of its maximum value, and its actual

value within 400 mils of the position of its minimum va are so small that for aiming points within these angles the pa lax need not be corrected. For other positions, the para must be corrected for obliquity. Aiming points should chosen, if possible, to reduce calculations.

1165. A point in rear of the guns is preferable to one in fr because the top shield does not interfere with vision.

A point on a flank is appropriate when at a greater dista than 1,000 yards and when enough to the rear to prevent being obscured by any of the matériel or personnel. At shor distances the recoil of the gun carriages materially changes parallax, thus shifting the sheaf of fire and causing irregul ties of distribution.

1166. When artificial aiming points must be established n the guns, the best direction for a common one is directly in re of the center of the line of guns. To reduce the effect of rec upon parallax a separate one may be placed directly in rear each gun.

1167. If the distant aiming point is apt to be obscured mist or smoke, then provision must be made for a seconda aiming point. The guns having been oriented on the target by means of the distant aiming point, the sights may, when neces sary, be turned upon the new aiming point and the latter used in subsequent fire.

Firing Over a Mask.

1168. When a position for masked fire is to be occupied, it necessary to make sure that the projectiles from each gun clear the mask and reach ground which is occupied or is e pected to be occupied by the enemy.

1169. If the guns are already in position and the mask is more than 200 yards in front, the guns may be given the ele tion and site corresponding to the nearest expected position the enemy, and a glance through the bores will tell whether th projectiles will clear the mask. At greater distances this metho is not applicable because the trajectory is not a straight line.

170. In the general case clearance of the mask should be
ed before the guns arrive, so as to preclude indecision and
in posting them. It is necessary to decide what are the
est range and the minimum site to be used. It can then be
led whether from the contemplated position of the guns the
ctiles will clear the mask and reach the desired territory.
ey will not, a place must be found from which they will.
solve the problem the height in mils of the trajectory at
mask is determined and compared with the height of the
in *mils*.

171. The sliding scale on the ruler may be used to deter-
the height of trajectory at the mask as follows:

Determine (*a*) the distance from guns to mask, (*b*) the
rence of level in mils between guns and target, (*c*) the range
rget.

Move the sliding scale on the ruler until the graduation
icating difference of level between guns and target is oppo-
that indicating distance to mask; then opposite the gradua-
indicating range target will be found the height of trajec-
(*h*) in mils at the mask.

Determine the height of the mask in mils. If it is less
n *h*, the projectile will clear the mask; if not, move back-
rd or forward until a point is reached where it is less.

Example: A position about 200 yards in rear of a crest is con-
plated, which will be masked from the opposing artillery and
l permit fire on an advance infantry position which is about
0 yards from the guns and has a site of 315.

R=2,000 yards.
d=200 yards.
a=15 mils.

lacing +15 of the sliding scale opposite range 200 on the
r, there is found opposite range 2,000 the value of 63 for *h*.
he site of the crest is found to be 340; that is, the crest is
mils above the position contemplated for the guns. The pro-
tile will clear the crest by 63—40=23 mils.

172. The sliding scale on the ruler also permits the deter-
nation of the minimum range at which fire will clear the mask.

Thus, taking the data of the preceding example, it is quickly determined that the minimum range is 1,300 yards.

1173. A convenient method for determining the distance from a mask at which the projectile will clear it is as follows:

1. Determine the height of the mask in yards.

2. Divide four times this height by the range from the mask to target in hundreds of yards.

The result will be the distance, with a large factor of safety, in hundreds of yards, from mask to gun so that the trajectory will clear the mask.

If it is desired to limit definitely the space in front of the mask within which fire can not be delivered, the **dead space**, the distance in hundreds of yards from the mask to the farther limit of the dead space, instead of the range from mask to target, should be taken as the divisor.

Another method is as follows:

From the covering crest measure the site of the target and the site of the limit of permissible dead space. To this add the elevation in mils corresponding to the minimum range from the mask. If this sum is greater than the site of the crest, measured by a man kneeling at the gun position, the mask will be cleared.

Or, subtract this sum from 600. The guns will clear *the mask* from any ground whose site, measured from the crest, is greater than the result of this subtraction.

1174. With sufficient accuracy for the solution of mask problems the elevation in mils corresponding to a given range is equal to 10 less than three times the hundreds of yards in range.

1175. Other methods may be used to obtain the above results, but such a knowledge of the trajectory and of slopes should be developed by training that, on ordinary terrain, officers will be able at a glance to occupy a position from which a given mission may be fulfilled.

1176. Whatever may have been the process employed for determining the position of the guns with reference to the mask, the possibility of firing will always be verified as soon as the pieces are in position by measuring the minimum range at which

›iece will clear the crest. The minimum range for firing ıll the battery is the greatest of the minimum ranges an- ed for the several pieces.

Measurement of Angles.

7. Angles may be measured in mils by means of the tele- the aiming circle, the ruler, the scale in the field glass known field of view, or by handbreadths.

telescope and the aiming circle are instruments of preci- The graduated field glass affords means of measuring accurately. When neither the telescope nor aiming circle ilable, or when time does not admit of their being set e may be made of the less reliable means, practice with will insure considerable accuracy.

8. For preliminary practice, horizontal and vertical scales ls should be laid off on any convenient vertical surface, an instrument of precision.

the ruler is already graduated the distance at which it *l* be held from the eye so that its graduations will cover ponding spaces on the scales must be determined by trial. ly this distance is then fixed by tying the ruler cord to ›thing or by knotting it and holding the knot in the teeth. en the hand is used for angular measurements, its distance the eye should be such as may be assumed naturally and mly and maintained without fatigue. The portions of ales then covered by different parts of the hand can be nined and memorized.

width of the field of view of the field glass can be deter- similarly and quite accurately divided by eye into halves, ers, and eighths.

making the above calibrations the operator must stand at sition of the instrument used in establishing the scales.

9. For measuring by handbreadths, each individual will ı the best results by predetermining, according to the ›ds just described, the value in mils of certain parts of the

Average values are given below, it being presumed that t hand is held vertically, palm outward, arm fully extended the front:

Width of first finger at second joint	
Width of second finger at second joint	
Width of third finger at second joint	
Width of little finger at second joint	
Width of first, second, and third fingers at second joint	
Width of first, second, third, and little fingers at second joint	
Width of thumb	

1180. Repeated practice should be had on varied terrain measuring both horizontal and vertical angles with the f glass, the ruler, and the hand, the results being checked by curate instrumental measurements.

1181. Frequently the terrain presents features that m possible the construction of rough vertical and horizontal sca whose origin is at an objective, which will serve to mea angles that must be noted during firing.

1182. Errors of measurement and calculation of angles the time required increase with the angles, particularly if rougher methods are used. If is important, therefore, to redu large angles as much as possible by resort to various expedient

For example, an assistant may sight across the face of t object glasses of the field glass upon the aiming point or target. The observer may then select an auxiliary point on a right li perpendicular to the line to the aiming point or target. A angle that must be measured may thus be reduced by as m as 1,600 mils.

Or the line to an aiming point or target may be fixed any two convenient objects, and the observer by placing him on this line may avoid the measurement of as much as 3,200 m

Deflection.

1183. To overcome the effects of wind and drift, a correct in deflection may be necessary. Its amount is generally sm however, and with a little experience may be readily estimat

e correction for drift is always additive; that for wind may
ther additive or subtractive, depending upon the direction
ıe wind. The value of each correction is first estimated;
are then combined to secure the resultant correction.
ıe following rough rules may be of assistance:
To overcome drift increase the deflection by 3 mils for
es up to 3,500 yards; by 5 mils for longer ranges.
To overcome a 10-mile cross wind change the deflection in
ıppropriate sense by an amount in mils equal to the num-
f even thousands of yards in the range.

84. The travel of a target during the flight of a projectile
cause variations in deflection for which correction must be
:.
the line of travel of the target makes an angle greater than
with the line of fire, take 5 mils deflection if the target is
ing at a walk; 10 mils, if moving at a trot; 15 mils, if
ing at a gallop. If the line of travel makes an angle less
ı 45° and greater than 15°, take one-half of the foregoing
ctions. For angles less than 15° make no correction.
the target is moving to the left, add the correction; if to the
t, subtract it.

85. When direct laying is to be used, the initial deflection
ing may be fully determined by the foregoing rules.

86. When indirect laying is to be employed, there must
be determined the deflection setting which will cause each
e to be directed upon its target when its line of sight is
:ted upon the aiming point.
unfavorable country it may sometimes require considerable
ıuity to direct the guns upon the target. The basis of the
ıod usually employed is to select a common aiming point and
:termine the deflection which will cause one of the pieces
ı laid on the aiming point to be pointed in the required di-
on. Such a piece is called the **directing piece.** The correc-
ı for wind, drift, and movement of the target are applied
the proper sign to the deflection of the directing piece. A
:ction is also determined which, applied in arithmetical
ression to the deflection of the directing piece, will give for
ı of the other pieces the deflection necessary to bring its line

of fire in the appropriate direction. This correction is called the **deflection difference.**

Deflection Difference.

1187. The principles involved in the determination of the deflection difference are best explained by assuming the target to be visible from the guns. Elementary instruction is best conducted, moreover, with the guns placed so that this will be the case, as a check may then be had on the computations made.

1188. If the guns of a battery at normal or other equal intervals are, with zero deflection, laid accurately upon the same point of a target—for example, its right edge—and the lines of sight are then all directed upon a common aiming point, the deflection readings will be found to increase or decrease from right to left by a common difference. This common difference in deflection is termed the **convergence difference.** It is the deflection difference necessary to produce converging fire, being positive if the deflections increase from right to left, negative if they decrease.

1189. The convergence difference may thus be measured directly if the guns are in position and the target can be seen through the sights. But the data should, in the general case, be obtained before the guns come up. Moreover, when indirect laying is to be employed the target is not usually visible from the guns. Direct measurement of the convergence difference is not then feasible in the usual case. By computation its value may be readily determined as follows:

(*a*) Determine the parallax of the aiming point and the parallax of the target.

(*b*) The convergence difference is equal to the parallax of the aiming point diminished **algebraically** by the parallax of the target. It is additive if this algebraic difference is positive, subtractive if it is negative.

1190. Assuming the guns to be still converged upon the right edge of the target, their fire may now be evenly distributed over the whole front of the target if we retain the same aiming point for all the pieces and the same deflection for the right piece but increase the deflection of each of the other pieces by an amount necessary to cause its line of fire to be directed upon

ppropriate part of the target. The common difference in ction necessary to effect this distribution is termed the dis- ıtion difference. Its value is obtained by dividing the front ıe target, expressed in mils, by one less than the number of in the unit firing. It is always additive, provided the right is directed upon the right section of the target, and the dif- ıce is applied in arithmetical progression to the deflection of right piece to determine the deflection of the other pieces ·der from right to left.

91. The algebraic sum of the convergence difference and distribution difference is the deflection difference. If con- ing fire is to be used, the distribution difference is zero and deflection difference is therefore equal to the convergence rence.

92. The following nomenclature is used to designate the ıs referred to above:

DD	Deflection difference.
CD	Convergence difference
F	Front of target in mils.
P	Parallax of aiming point.
T	Parallax of target.
X	Number of guns in unit firing.

193. The relations brought out in the foregoing discussion ; be expressed as follows:

ıle I: The convergence difference is equal to the parallax of aiming point diminished algebraically by the parallax of the ;et; or, CD=P—T.

ıle II: For converging fire the deflection difference is equal he convergence difference; or, DD=P—T.

ıle III: For distributed fire the deflection difference is equal he convergence difference increased algebraically by the dis- ution difference; or, $DD=P-T+\frac{F}{X-1}$

specialw case of distributed fire is parallel fire. If the lines ire are parallel they are directed upon points just a platoon it apart. Therefore, in the last equation, $\frac{F}{X-1}=T$ and DD=P. nce we have

Rule IV: For parallel fire the deflection difference is equal t the parallax of the aiming point; or, DD=P.

1194. Rule IV affords a quick and ready means of distu uting fire, since, to determine the deflection difference, an e mate of the distance to the aiming point and a computati of its parallax are all that is necessary.

1195. The foregoing rules afford a method of determining t **deflection difference** necessary to produce either converg parallel, or distributed fire. If the pieces have a common aim point and any piece is given a deflection which will cause its l of fire to be directed upon its appropriate section of the tar the desired convergence or distribution may be secured by gi the other pieces the deflection of this directing piece increa (or diminished) by as many times the deflection difference there are platoon fronts between it and the piece consid (960).

The Deflection of the Directing Piece.

1196. If it is possible to point the directing piece upo target by looking through the sight, or by occupying an e vated position in rear and looking over the line of metal, th its deflection from an aiming point may be measured. Or, an observer posted near the position of the directing piece c see the target, he may measure the angle in mils between th aiming point and the target, and this may be taken as the defle tion. By taking post on a tower or ladder, by climbing a tr etc., the target may sometimes be seen from near the gun.

Or, two men may be posted between the gun and the ta so that one can be seen from the gun. The one nearest the g must see the other and the gun. The one nearest the gun m see the other and the target. By directing one another, th men can establish the line from the gun to the target.

But if the observer must be at a considerable distance fr the guns, then the deflection of the directing piece must secured by measuring at the observing station the angle fr aiming point to target and transforming this angle for use the guns.

97. This transformation may be effected (*a*) by the paral-
nethod; (*b*) by the parallel method.
e parallax method is used to best advantage when the
·ving station is in prolongation of the line of guns and not
: than 400 or 500 yards away. It is an extremely quick
iod, the necessary computations being readily made men-
after facility has been gained.
98. (*a*) **The parallax method**: To illustrate this method,
t be assumed that the observing station is on the right
: of the guns, in prolongation of their front, and at a distance
platoon fronts from the right piece.
: the observing station the angle A is measured from the
ng point to the right section of the target. This angle
be considered as the deflection necessary to cause an
ginary piece at the observing station to be directed upon
right section of the target; the actual directing piece, *n*
oon fronts away, may be converged upon the same part of
target by increasing (or diminishing) the deflection of the
ginary piece by *n* times the convergence difference. The
ess is then altogether similar to that before explained for
ing convergence in an established line of guns. We have
1

ule V: The deflection of the directing piece is equal to the
le from aiming point to target, as measured at the observing
ion, increased algebraically by as many times the conver-
ce difference as there are platoon fronts in the interval be-
en observing station and directing piece; or, $D=A+n$
-T).

the observing station is on the right flank, *n* is positive
he foregoing equation; if it is on the left flank, negative.
99. If the observing station is not on the prolongation of
line of guns, but is in advance of or rear of that line, the
rval between observing station and directing piece must be
sured perpendicularly to the line joining that piece and
target.
1 the latter case the data secured will probably be only
roximately correct; but the error in direction should not

be great, and errors both in direction and distribution sh be readily corrected by subsequent observation.

1200. The parallax method thus outlined gives great fac in transforming the deflection, not only from an observing tion to a battery, but from battery to battery along a lin guns having a common aiming point. A great variety special cases will be met in practice, but if the possibilities the method are fully grasped some adaptation will us afford a solution. By constant practice in the solution o sorts of cases facility in the use of the method is to be tained. The great advantage of the method is that it permi rough approximation of the direction from gun to targe be quickly furnished. The approximation should be enough to permit the first salvo to be observed; errors then be quickly recognized and corrected.

1201. (*b*) **The parallel method:** Points may be quickly lected, by estimation, in the direction of the aiming poin the target such that lines from the observing station to will be approximately parallel to lines from the gun t aiming point and the target. The included angle will be deflection.

Or, the interval in yards from the observing station to line from the gun to the aiming point is measured *or* e mated. The angle at the aiming point subtended by th interval is computed and laid off on the side of the aiming po farthest from the gun. An auxiliary point is there noted on terrain. Similarly, the angle at the target subtended by interval from the observing station to the line of fire termined and laid off on the side of the target farthest the gun; and an auxiliary point is noted. The angle bet lines to these auxiliary points will be the deflection.

For example: The observing station is 100 yards to the of the directing gun, the aiming point is 4,000 yards to the fr and the distance to the target is 2,000 yards. One hun yards at 4,000 yards corresponds to 25 mils and 100 yard 2,500 yards corresponds to 40 mils. Starting at a point 25 to the left of the aiming point, measure to a point 40

e left of the target. This angle is the deflection of the ting piece. If the aiming point is very distant and the dis-ment from the gun is not great the correction at the ıg point may be disregarded.

02. The special advantage of an aiming point common to he guns is that the officer conducting the fire may then simply calculate and establish the direction and distribu- of his fire.

03. If an aiming point visible from all the guns and from observing station can not be found, then some expedient t be devised for directing the guns upon their targets. The ›wing are given as examples of such expedients:

ample 1: The guns are in a depression and all view of the ounding country is cut off. No natural aiming points are lable. The battery commander, mounted on an observ-tower, can see the target provided his tower is placed in of the third piece.

›lution.—The captain places his tower in rear of the third e and, looking over the line of metal, directs the gun upon ıppropriate part of the target.

e causes the gunner of the third piece to turn his panoramic ıt upon the centers of the rammer staffs held vertically at sights of each of the other pieces in turn and to read off the responding deflections. For pieces to the right of the third e this deflection is increased 3,200; for pieces to the left it diminished by 3,200. The resulting deflections are in each e set off on the sights of the respective pieces, and they are a laid, using the sight of the third piece as an aiming point. allelism of the lines of fire is thus secured.

he deflection of each piece may then be measured from an ficial aiming point.

xample 2: Suitable aiming points can be seen from the guns, none of them are visible from the observing station which, account of the lay of the ground, must be placed about 400 ds to the flank of the guns.

olution.—The battery commander decides to designate his scope as a temporary aiming point. He determines the de-tion of the directing piece as follows:

(*a*) Sets the telescope at 3,200, directs it upon the sight of directing piece, and clamps the lower limb; unclamps the u limb, directs the telescope on the target, and reads the angle

(*b*) Measures or estimates the interval in yards between t scope and gun, divides this amount by the number of thous of yards in range to target, and thus procures the angle in m at the target subtended by the interval between telescope a gun.

(*c*) Adds this angle to the angle measured by the telesc if the telescope is on the left of the guns, subtracts it if t telescope is on the right. The result is the deflection to be u by the directing piece, the telescope being the aiming point.

Setting off this angle on the sight of the directing piece using the telescope as an aiming point, the piece is laid on t target. The direction of this piece may then be referred to a suitable aiming point. By computing the deflection differe in the usual way, the deflection to be given the other pieces m then be determined.

1204. The captain may have to occupy an observing st such that the data for computation can not be obtained.

Example: The executive has established the sheaf of fire the general direction of the center of the sector assigned.

Solution.—The captain causes a single round to be fired fro one of his interior pieces and corrects the deflection in accor ance with the observed result.

1205. The situation may be such that the pieces must scattered at irregular intervals and without regard to alignm The sheaf may be formed by the method described in paragr **968.**

1206. When battery salvos are used, the second (third) p should be taken as the directing piece and its deflection ca lated for the right (left) of the target.

When platoon salvos are used, the first (fourth) piece sho be the directing piece, its deflection that for the right (left) the target.

1207. When the deflection and deflection difference have be calculated under conditions exceptionally favorable to ac

results the computed data should be used. Otherwise the
l deflection or initial shift is best announced as the mul-
of 10 nearest to the determined value; and, except against
narrow targets, the initial deflection difference as the mul-
of 5 nearest to a value determined by increasing alge-
ally by 10 the parallax of the aiming point.

Site.

08. The correct determination of the site is important in
esultant saving of time and ammunition and in the produc-
of effect during fire for adjustment.

the target is visible from the position of the guns, the site
be measured there. If the target is not visible from the
ion of the guns, the site may be measured at the observing
on and transformed, if necessary, for use at the guns.

open country the site may often be estimated with sufficient
racy by referring the site of the target to a distant horizon
site of which is ordinarily 300.

09. If the observing station and the guns are at approxi-
ly the same level, and at approximately the same distance
the target, the angle measured at the observing station is
l without change at the guns.

10. If the observing station is near the guns, but at a dif-
nt level, the angle measured at the observing station is cor-
ed, as follows: Estimate the difference of level in yards be-
en observing station and guns; convert this difference into
by dividing the number of thousands of yards in range to
et and apply the result with the proper sign as a correction
ie site of the target as measured at the observing station.

ample:

measured at observing station_____= 320 mils.
mated height of observing station above guns_= 30 yards.
ge of target (measured or estimated)_____=3,300 yards.

$$\text{Correction}=+\frac{30}{3}=+10 \text{ mils.}$$

te at guns=320+10=330 mils.

1211. If the distances to the target from the observing s tion and the guns materially differ, the angle measured at observing station is corrected as follows: Determine the di ence of level in yards between observing station and guns (and between observing station and target (Lt) by measu the difference of level in mils, and converting this differ into yards by multiplying it by the number of thousands yards in the distance from observing station to gun or ta Determine the difference of level in yards between gun target by taking the sum of the foregoing differences if observing station is at a level intermediate between the and target, by taking their difference if the observing st is above or below both the gun and target. The result is affe with a positive sign if the gun is below the target, with a n tive sign if the gun is above the target; and it is then conve into mils by dividing by the number of thousands of yards range. Applying this correction to 300 with the proper s the site at the gun is obtained.

The operations to be performed in effecting this trans tion are set forth in detail in the Field Artillery Data Boo

Example:

Difference of level between observing station and gun, in mils.....(Sg) = −
Difference of level between observing station and target, in mils.....(St) = +
Distance from observing station to guns, in wards..(BG)=1.
Distance from observing station to target, in yards..(BT)=4,
Distance from guns to target, in yards.....(R) =3,

$$Lg = -50 \times 1.2 = -60$$

$$Lt = 10 \times 4.5 = 45$$

$$SI = 300 - \frac{\frac{Lg - Lt}{R}}{1{,}000} = \frac{-60-45}{3} = 300 + 35 = 335.$$

1212. Except where instruments are known to be in ex adjustment and ample time is available for calculating d the site should be given in terms of the nearest multiple of

13. If a very broad target sloping sharply at right angles
e plane of fire is to be attacked, it will generally be neces-
in order to secure exact adjustment of the fire, to vary
sites by a common difference from one flank of the line of
to the other. The value of this common difference may
letermined by finding the difference in site between the
flanks of the target and dividing this difference by one less
the number of guns firing.

14. A change of site does not change the range to the point
urst in air, but increasing the site raises the point of burst
ime fire and lengthens the range in percussion fire, while de-
sing the site lowers the point of burst in time fire and
tens the range in percussion fire.

Percussion Fire.

215. Percussion fire is principally employed for the destruc-
of material objects, such as walls, buildings, obstacles, artil-
matériel, etc. Such fire is termed **fire for demolition.** It is
appropriate for fire against troops in woods or in confined
ces.

or the destruction of artillery matérial or other targets of
relief, light field guns may be used, but such use at ranges
eeding 2,000 yards requires the expenditure of much am-
nition.

Time Fire.

216. Time fire is employed for the attack of animate objects
aircraft, and gives more incendiary effect than percussion

Corrector.

217. The corrector setting should be such as will cause the
in point of burst to be about 3 mils high during fire for
ct; about 1 mil high during fire for adjustment.

Due to variations in powders and fuse compositions and to
nospheric conditions, and to errors in the determination of
site, the most suitable corrector must be determined in each

individual instance. Hence, at the commencement of fire, a t corrector must be taken. This trial corrector is such as is gested by previous experience with the ammunition in use with local atmospheric conditions.

Method of Fire.

1218. In deciding upon the number of guns to be empl the captain should consider the nature, size, importance, range of the target to be attacked, the conditions of obs tion, the firing data already determined by previous fire, supply of ammunition, the tactical situation.

1219. Fire by battery has the advantages of increasing chances of discovering abnormal errors of gun service a observing more than one round, thus establishing quickly basis for changes of direction, height of burst, and r When the range has been accurately determined it incr the probability of obtaining both shorts and overs at the salvo and effect on a wide front of the target. It also h advantage of at once setting all of the trail spades.

Fire by platoon has the advantage of simplifying anal of the observation of individual bursts with respect to ra distribution, and height of burst, and of saving time in t launching of each salvo. It requires somewhat less ammun tion than by battery and, in some cases, may increase the p centage of rounds correctly observed for range.

Fire by piece is appropriate to check a very doubtful de tion and, in some cases, for fire for registration.

1220. Salvos insure the identification of individual ro and, with the exception of distribution, more accuracy in servation of fire. They are favorable to accurate service of piece.

Volleys are faster than salvos and give better observation distribution.

1221. Salvos usually commence on the leeward flank of guns, in order that the burst of one round may not be obsc by the smoke or dust of the other.

Range.

2. The initial range may be determined by means of a finding instrument, by angle-measuring instruments, and sured base, by the use of maps, by sound, by estimation, auxiliary observers, from previous fire, or from other

Every auxiliary means, time permitting, should be em l to assist in the measurement of the range, since its or redetermination is essential to promptness of effect. In cases an officer must rely upon his own estimate of the ice. By constant practice it is possible to gain the ability imate distances closely, and it is imperative that artillery should acquire this ability. In such training distances l be estimated to permanent features of the terrain rather to targets known to have been arranged for service ice.

3. If the objective is indistinct, or if the air is calm or y blowing from the range toward the observer, so that the e of bursts is likely to obscure the target for an appre time, the first range used should be somewhat long.

4. If fire over friendly troops near the target becomes inev y, the first range used should be surely long.

Atmospheric Influences.

25. The range and normal corrector are influenced by the spheric temperature and pressure. The effect of moisture e air is negligible.

e lower the temperature, the shorter the range; the higher mperature, the longer the range.

e lower the atmospheric pressure, or barometer, the longer ange; the higher the pressure, the shorter the range. In gh altitude, where the pressure is lower, the range is r.

summer, when the temperature is high and the barometer the range is long; in winter, when the temperature is low the barometer high, the range is short.

An accelerating wind increases the range. A retarding
has the opposite effect.

The lower the temperature, the more slowly the time
burns; the higher the temperature, the more rapidly it b

The lower the pressure, the more slowly the time train bu
the higher the pressure, the more rapidly it burns.

The normal corrector depends on both the range and
action of the fuze, so that the effect of atmospheric condi
on the normal corrector is the resultant of their effect on
flight of the projectile and on the fuze.

The lower the temperature, the higher the normal corre
the higher the temperature, the lower the normal correcto

The lower the pressure, the lower the normal corrector;
higher the pressure, the higher the normal corrector. In a
altitude the normal corrector is lower.

In summer the normal corrector is low; in winter it is h

The effect of a high altitude upon the normal corrector
be either decreased or increased by the effect of tempe
variations.

An accelerating wind lowers the normal corrector; a retar
wind has the opposite effect.

The daily variations in range and normal corrector cau
by atmospheric conditions increase with the range. *At* ran
less than 3,000 yards daily variations are not important.

Summary.

1226. In determining the data for indirect laying, the fo
ing is a summary of the operations which may be carried
when an observing station on the flank of the guns ma
taken and a suitable one can be found within 400 or 500 y
of the guns.

1. Select an observing station from which a good vie
the target and its surroundings may be obtained which is
close to the guns as the conditions permit and which is as ne
as possible on the prolongation of their front.

Select an aiming point which is surely visible from all uns, whose direction is as nearly normal to the front as ıle and whose distance from them is preferably not less 2,000 yards.

Measure the angle from aiming point to target, the site, and ront of the target in mils.

Measure or estimate the distance to aiming point and to : and compute the parallax of each. Correct the parallax : aiming point for obliquity if the line from the directing o the aiming point makes an angle greater than 400 mils the normal to the front of the guns.

he observing station is at a considerable distance from the of the battery prolonged, the parallax both of the aiming and the target must be determined with reference to a ın front on the line station-directing piece for use in com- g the deflection of the latter and with reference to a on front in the battery for use in obtaining the deflection ence.

Determine the convergence difference by Rule I, estimate asure the distance to the directing piece and apply Rule V ie determination of the deflection.

Determine the deflection difference by Rules II, III, or IV.

Correct the site, if necessary, for difference of level be- 1 observing station and guns, adopt the corrector which ious fire has shown to be the most suitable, and take the e as measured or estimated.

ample 1: A battery is ordered to take a masked position in vation and be ready to fire upon an indicated hostile bat- whose range is known to be 2,100 yards. The battery com- ler finds an observing station 200 yards to the left of the piece and on the prolongation of the battery front. He s an aiming point in rear, 5,000 yards away. He finds that is ample time to make accurate measurements and compu- ns.

the observing station he finds: A=2600 mils; F=30; 293. He notes that the observing station and guns are tically at the same level.

He computes:

P=20/5=—4, or, =—3, when corrected for liquity (A=2600).

T=20/2=10.

P—T=—3—10=—13.

$$\frac{F}{X-1}=\frac{30}{3}=10.$$

DD=—13/10=—3.

n=—10 (to right piece.)

D=2600—10 (—13)=2600/130=2730.

1. Aiming point, that chimney.
2. Deflection, 2730.
3. On first piece, close 5 (taking nearest multiple of 5 the first salvo).
4. Site, 293.
5. Corrector, 28.
6. Battery right.
7. 2100.

The operations are simplified if ample time is not avail and approximate methods are used, taking the third piece example, as the directing piece:

P=—3.

T=10.

DD=—3—10=—13.

n=—8.

D=2600—8 (—3—10)=2704.

1. Aiming point, that chimney.
2. Deflection, 2700.
3. On third piece open 5 (10) (opened from parallel fir 10 or 15).
4. Site, 295 (nearest multiple of 5).
5. Corrector, 28.
6. Battery right.
7. 2100.

Example 2: A battery which has just taken a position in open and is firing upon a disorganized enemy is directed to

e upon a large body of retiring Infantry. The target can
e seen from the position of the guns.
e battery commander finds a place to the right flank and
ly in front, from which he can see the target. Using the
, he measures the angle from a prominent tree to the
an as 350 mils; he estimates distance to target as 2,500
s, to aiming point 4,000 yards, to second piece 7 platoon
s.

computes:

P=5.

T=8.

P—T=5—8=—3.

n=7.

D=350+7(—3)=329.

estimates the target to be on the level with his guns,
les to use an open sheaf and commands:

1. Aiming point, that lone tree.
2. Deflection, 330 (nearest multiple of 5).
3. On second piece open 15 (open by 10 from parallel fire).
4. Site, 300.
5. Corrector, 28.
6. Battery right.
7. 2,500.

he captain estimates the direction of the third piece as cor-
, the distribution as somewhat too large, the height of burst
igh (all four burst in air mean height 9 mils), and the range
ndeterminate (on account of the high bursts).
e commands:

1. On third piece close 5.
2. Down 10.
3. 2,500.

fires such other salvos as may be necessary to effect the
stment.

ample 3: Having fired upon the target of the previous ex-
le until it disappears at 3,000 yards, the battery commander
another body of troops whose range he estimates as 2,000

yards. Using the ruler, he finds that his target is 200 m
the right of the last target and that its site is 295.

Treating the old target as an aiming point, D=6,
(7—10) —=6,175.

He commands:

1. Right, 225.
2. Site, 295.
3. Corrector, 20.
4. Battery right.
5. 2,000.

SECTION IX.—OBSERVATION OF FIRE.

1227. The officer conducting the fire, unembarrassed b
tails of the service of the guns, and assisted by members o
battery commander's detail, should devote himself to obse
and correcting the fire and adapting its employment to me
requirements of the situation. He should train himself to
accurate and quick estimates and to act on them with d
and boldness.

1228. To overlook ground which is invisible to the
conducting the fire and to assist generally in the adjustme
fire, free use is to be made of auxiliary observing parties.

1229. Such parties occupy the most favorable observing
tions which the conditions of the combat admit. Preferab
they are as near the enemy as possible.

1230. Their special duties are to furnish information w
will assist in the adjustment of fire and to keep the Arti
commander informed of movements of the targets or of our
troops which would affect the employment of fire.

1231. With respect to the adjustment of fire, they in
especially whether the range is short, over, or correct; wh
the burst interval, when in front of the target, is too great
small, or correct; whether the direction is right, left, or co

If large errors in range are made, an observer on the fir
the guns will not usually be able to separate the errors in r
from those in direction; in such a case the observer would
narily signal the direction only, as right or left, as it appear

and the officer conducting the fire, knowing the position of observer, would deduce the sense of the salvo, over, in e. If the observer is to the right of the line of fire, shots ding short of the target appear to be to the left, while those ding over appear to be to the right, and vice versa if he is on left of the line of fire.

232. With respect to movements of the enemy, the observer orts especially: If the enemy abandons his position; if he ts to the right or left, front, or rear to escape effective ; whether hostile reenforcements enter the sector and their ition.

233. With respect to our own troops, the observer makes h reports as to their movements and situation as will enable artillery commander best to assist them with the fire of guns.

234. Arrangements should, moreover, be made to obtain m advanced troops information which will assist in the justment of fire, and indication as to when fire should be mmenced or discontinued.

235. Sure and definite means of communication must be ablished between the artillery commander, his observing rties, and advanced friendly troops. If time and material mit, wire communication is provided, but visual signaling ust always be relied upon to a greater or less extent.

236. For observation of fire, for study of the terrain, and r the quick recognition of objectives, good field glasses are dispensable. All officers, agents, signalers, and scouts of field illery should be equipped with suitable glasses and should skillful in their use. A monocular glass is not suitable for servation.

237. Field glasses should have a magnifying power of from o 8 and a field of view of 90 mils or more. They should give en illumination and sharp definition and be dust and moisture oof. A means of adjustment to interpupillary distance is portant. Independent focusing devices for each eye are preferable.

1238. At the commencement of the fire it is usually best to watch for the burst of the shots with the unaided eyes, for if a large error is made the bursts may not appear in the field of view of a telescope or field glass. After the bursts have been located the glasses may be quickly brought into play, if necessary.

As soon as the points of burst have been brought to the vicinity of the target they are observed by the aid of field glasses or the telescope, and all the indications carefully noted which assist in the determination of their relative positions with respect to the target.

1239. Sustained use of an observing instrument reduces acuity of vision. Glasses should not be used, therefore, except with a definite purpose.

1240. In order that any instrument may be quickly adjusted to the eyes, all observers should commit to memory their individual pupillary distance and the eyepiece setting for each eye.

1241. The use of a mounting for field glasses reduces the time during which they must be held to the eyes and helps toward certain and continued identification of objectives during accurate study and observation of terrain and of fire.

1242. The line to an objective may often be conveniently fixed by placing an object on the ground between it and the observer.

1243. Correction of fire is based on observation of bursts in air or on impact, and of effect upon the target or upon the terrain.

Bursts in Air.

1244. A burst in air produces a ball of smoke which ordinarily remains together for an appreciable time.

1245. When the shrapnel bursts, the smoke, white or light gray in appearance, is projected in the direction of the trajectory. The point of burst is therefore always above the center of the smoke ball. At ranges beyond about 2,000 yards the point of burst is near to or above the summit of the smoke ball, and the latter, observed from near the plane of fire, is seen in a pear-shaped form, small end uppermost.

46. When viewed from a flank, the direction of the smoke outlines the trajectory to a greater or less extent. The e from a group of shots, when viewed from a flank, usually give a definite idea as to the point at which the mean ctory meets the ground.

47. An air burst after ricochet gives a pear-shaped smoke with the broader end up.

48. Occasionally a burst in air close to the ground will give tened smoke ball discolored by dust or mud in consider- quantity, caused by the impact of a large number of bullets small area.

Bursts on Impact.

49. When a common shrapnel bursts on impact the smoke is discolored and fugitive, its upper portion wide and ular but somewhat flat.

50. When a shell or high-explosive shrapnel bursts on im- a large irregular columnar mass of black smoke and dirt ed, which remains visible for some time.

51. The bullets and fragments from a burst in air knock considerable amount of dirt and dust if they strike dry on wet soil splashes of mud are knocked up by the shrapnel and large fragments. Occasionally the effect of bullets fragments may be observed in the flattening of long grass the movement of brush or tree branches.

52. An air burst of high-explosive shrapnel is followed by cussion burst of the head. This ammunition, therefore, s opportunity to obtain more information than does the on shrapnel or shell. Care should be taken to distinguish pact burst of the head from a graze burst of the whole tile.

Direction.

53. Errors of direction of the sheaf of fire as a whole or lividual rounds may be measured; if small, they may y be estimated with sufficient accuracy by eye.

measurement or estimation of these errors may best be when the observer is near the line joining gun and target;

viewed from the flank, the error in direction is complicat with that in range, and its observation is particularly subj to inaccuracy when the shots are fired at ranges sensibly di ent from that of the target.

Height of Burst.

1254. The height of a burst is measured or estimated fr the bottom of the target to the point of burst if the target is concealed in trenches or behind a crest; otherwise it is m ured from the summit of the covering crest.

1255. The height of a group of bursts is the mean of t individual heights of burst.

1256. In estimation, the observer may often refer the b to some convenient point in the terrain, the angular distance which above or below the bottom of the target or the cover crest has previously been determined.

1257. For convenience, bursts are classified as follows:

Graze: Bursts on impact.

Below: Air bursts below the target.

Graze below: Graze bursts below the target.

Low: Air bursts from zero to 2 mils above the bottom of t target.

Normal: Air bursts from 2 to 4 mils above the *bottom of* t target.

High: Air bursts from 4 to 6 mils above the bottom of t target.

Very high: Air bursts more than 6 mils above the bottom the target.

1258. Inaccuracy of observation is to be avoided by pro decision upon a consideration of the formation and normal pearance of the smoke ball. Such inaccuracies are the sen of bursts in air as lower than they actually are, due to sens on an inappropriate part of the smoke ball; to the sensing low of graze or below bursts; and to the sensing as air burst bursts after ricochet.

Range.

59. It is rarely possible from a position near the guns to nate with accuracy the amount of the error in range. Such nates are usually too small and cause delay through an rt to correct the fire by making timid and insufficient changes ie range.

ttention should rather be concentrated on deciding, from ful observation of each shot, upon the sense of a number of s fired with the same range and site, and on quickly in- ing the target with fire which is surely short and fire which surely over. By narrowing the bracket thus determined tive adjustment may be secured.

salvo or volley is considered **short** if all of the observed sts are short; **over** if all of the observed bursts are over; cketing if half of the observed bursts are over; **mixed** if the jority of the observed bursts are over and the minority are rt, or **vice versa.**

he observer should train himself to decide quickly upon the se of each shot as **short, over,** or **doubtful,** and upon the sense each group of shots as **short, over, bracketing, mixed,** or ubtful. It may be necessary, however, to allow time for the oke to form and reveal its relative position with respect to the get.

If the sense of a shot can not be definitely decided upon, it is ubtful, and should be disregarded.

260. The most accurate sensing of range is based on obser- ion of effect on the target. Such observation will be more en possible in war than in peace. Next comes observation bursts on impact, then of effect on terrain, then of the posi- n of the smoke ball with respect to the target.

261. Frequently irregularities of the ground or its nature vent the observation of graze bursts so that low bursts in must be sought. This is the usual case.

262. If the observer is considerably above the target, or the get is on ground sloping toward the observer, the sense of a vo (**short or over**) may usually be recognized readily by noting

the relative position with respect to the target of graze burst of the projectile or of the head of high explosive shrapnel of fragmental hits from bursts in air.

Information obtained from the observation of the effect th produced is reliable when it is observed as **over**; it should accepted with caution when observed as **short**, unless the burst **low.**

1263. If the target and its vicinity can not be seen from superior elevation, if the ground near the target is at abo the same elevation as the observer, or if the ground in fr or rear of the target can not be viewed, the deductions as the sense of the salvo are to be formed especially from manner in which the puffs of smoke from the bursts affect appearance of the target.

1264. If the outlines of the target are more clearly defi against the smoke of the burst, the range may always be co sidered as **over**, whether the burst occurred in air or on gra

1265. If the target is obscured by the smoke of the burst range may be considered as **short**; but, in the case of a burst air, the burst must be **low** in order to warrant this conclusion.

1266. If the target is first obscured and then immediate silhouetted by the smoke or dust, or the reverse, the range nearly that of the target.

1267. If the target is indistinct and of about the same colo as the smoke, it may be less visible against the smoke as a bac ground. A burst beyond the target may, for this reason, so times seem to obscure the target, and hence be judged sh when it is in reality **over.** On the other hand, some targ become very much more visible if projected **against** a sm background.

1268. If the actual point of burst is observed in line, or a proximately so, with the target and is below it, the range short. If a graze burst is observed above the target and in li with it, or nearly so, the range is over. Occasionally a gr burst wide of the target may be sensed for range through care study of the terrain.

1269. Frequently the target occupies terrain of such a natu as to justify sensings of rounds, when the deflection is known

pproximately correct, as lost over. But soft or swampy nd may completely smother a burst and prevent sensing.

270. If the wind is blowing up or down the range, a decision d be formed quickly as to the relative position of the smoke respect to the target. But if the wind is blowing across ange, it may be better to wait until the smoke has drifted s the front or rear of the target. To secure this result it be desirable to direct the fire at the windward flank of the t.

271. In observing bursts with reference to a crest, care must aken not to be deceived by a crest parallel to the crest ht but short of it. In rolling country such an intermediate is often present, and it may merge into the background ed by the higher ground in its rear, and hence escape de- on, while, as a matter of fact, there may be a broad valley epression between the two crests. Shots observed against near side of the intermediate crest are short and easily ed, but shots which pass over the intermediate crest and t low or on graze in the valley between the two and are may be thought to have cleared the farther crest and neously sensed as over. Such deceptions may be avoided obtaining bursts in air on the line joining the observer and crest sought. If the ball of smoke is cut in two by the t and the crest clearly defined against it, the burst is over. he crest is concealed by the smoke, the burst is short. The t bursts may often serve to reveal the existence of the inter- late crest by causing the latter to be silhouetted against smoke.

272. When the smoke of burst rises from behind a crest the t is over the crest.

273. When the burst is in the direction of a wood the smoke may present a ragged appearance due to its being partly len by branches or foliage. The indication is that the burst eyond the near limit of the wood.

274. If the sun is shining, information as to the sense of st in air may often be obtained by observing the shadow of smoke ball on the ground. The height of the burst and the ltion of the sun must, however, be taken into consideration.

1275. In certain cases, such as in fire against air craft at night, fire against masked targets, range sensings will either extremely difficult or impossible from the vicinity of guns. Recourse is then had to lateral observers.

The more uncertain the direction of fire or the greater range of the target, the greater should be the distance of observer from the line of fire.

1276. Observations of range from lateral positions are complicated by errors of direction. But if the direction is correct all shots seen by the flank observer will be over if they are the side of the target corresponding to his side of the line fire, and short if they appear on the opposite side of the tar

SECTION X.—OBSERVATION OF TERRAIN.

1277. An accurate conception of the terrain in the vicinity the target increases the number of rounds which may prop be called sensible. Preparatory to opening fire the study ground forms around the hostile positions should be taken and this should be continued during the action. Auxiliary servers may give valuable information. If maps are availab they should be studied. Practice in making position and pl sketches and a comparison of the sketches with *the actu* terrain will increase facility in judging ground from a distan

1278. It is necessary to locate ravines or hollows whi might catch and hide the bursts. The smoke from such bursts apt to rise and reveal itself after a time, but false deducti may be drawn from it. Thus, the smoke from a burst short the target may have become so much dissipated by the tim appears that the target may be seen through it and the im sion produced that the target is silhouetted against the sm Moreover, if a strong cross wind is blowing, the smoke, wh appears, will probably be at some distance to the flank of actual point of burst, and erroneous conclusions as to the tion of the salvo may thus be reached. Such false deduc may be avoided, however, if the lay of the ground is appre and considered.

e upon a large body of retiring Infantry. The target can
: seen from the position of the guns.
: battery commander finds a place to the right flank and
ly in front, from which he can see the target. Using the
he measures the angle from a prominent tree to the
n as 350 mils; he estimates distance to target as 2,500
to aiming point 4,000 yards, to second piece 7 platoon
.

computes:

P=5.
T=8.
P—T=5—8=—3.
n=7.
D=350+7(—3)=329.

estimates the target to be on the level with his guns,
s to use an open sheaf and commands:

. Aiming point, that lone tree.
. Deflection, 330 (nearest multiple of 5).
On second piece open 15 (open by 10 from parallel fire).
Site, 300.
Corrector, 28.
Battery right.
2,500.

captain estimates the **direction** of the third piece as cor-
ie **distribution** as somewhat too large, the **height of burst**
1 (all four burst in air mean height 9 mils), and the **range**
:terminate (on account of the high bursts).
ommands:

On third piece close 5.
Down 10.
2,500.

es such other salvos as may be necessary to effect the
ment.

nple 3: Having fired upon the target of the previous ex-
until it disappears at 3,000 yards, the battery commander
nother body of troops whose range he estimates as 2,000

1284. Hitting the target is the most tangible and least qu tionable form of useful effect, because the essential object artillery is destruction of the adversary.

If this destruction can not be accomplished, the effort m at least, effect the neutralization of the enemy by impos upon him a partial or complete state of inactivity. In ad tion, the guns bring a moral support to friendly troops, m may divert from them the attention and fire of the enemy.

1285. Artillery may produce important effects of neutrali tion, moral support, or diversion. These will be the more sur obtained if they are accompanied by great physical effect. B they may be obtained though physical effect is slight. Th effects are to be considered in the decision to start or stop fire or to vary its intensity.

1286. The terrain should be closely observed and studi with a view of determining whether or not it offers cover to enemy, or visible points, which can be used either as aim points or as reference points to facilitate the identificati targets.

1287. Preliminary adjustment may be dispensed with when the necessary data have been determined by previous fi or when the range is very short.

Fire for Adjustment.

1288. During adjustment, observation is the first consider tion.

1289. By observing the points of burst or fall and judg their relative positions with respect to the target, the modifi tions in the deflection, corrector, site, and range settings re site for more certain observation and for adjusting the fi upon the target are determined.

1290. Adjustment is effected upon the target itself, if pr ticable. In many cases, however, the target will not be vis to the officer conducting the fire, though its approximate p tion may be known. Thus, the target may consist of tro concealed behind a ridge, or behind a wall or hedge, or in t edge of a village, a forest, or a field of standing grain.

me prominent feature of the terrain in or near the enemy's
n positions—for example, a tree, a house, a mass of rock,
-is then selected as a **registration mark**, and by means of
s, observers in balloons, or any available means, the
y's location with respect to this mark is determined within
narrowest possible limits.

e fire is then adjusted upon the registration mark, and the
within which the target has been located is searched by
subsequent fire.

91. If the circumstances permit, advantage may be taken
ills in the action to secure at least a rough adjustment upon
lities in which the enemy is known to be or near which he is
cted to appear. Such a fire is termed **fire for registration.**
data are thus secured for opening promptly an effective
upon an enemy appearing at or near the positions upon
h the fire has been registered; by minor modifications in
e data a quick adjustment on the target may be secured.

92. Fire for registration may be conducted to discover acci-
s of ground which might conceal an enemy or hide the
ts of burst of our projectiles.

93. Registration of fire is especially appropriate for artil-
to which definite sectors of observation have been as-
ed.

' the enemy's position within the sector has not been located,
artillery commander proceeds in a systematic way to secure
data which will enable him to reach promptly and effec-
y any part of the sector. He studies the terrain, decides
the limits in width and depth of the area to be registered,
s the specially prominent features of the terrain within
e limits, and by actual firing directed upon these natural
ures secures the data which will enable him to reach
ptly any target appearing in their vicinity.

94. Fire for registration should never be used if the loca-
of the fire unit is likely to be thereby revealed.

95. Adjustments of four kinds are required, viz:

In direction.

In distribution.

3. In height of burst (in case of time fire).

4. In range.

Adjustment in direction involves the establishment of deflection to bring the sheaf of fire to bear upon the target.

Adjustment in distribution involves spreading the sheaf the desired front of target. Modifications of deflection set are hence necessary.

Adjustment in height of burst involves the determination corrector setting, which will cause the mean point of burst at the desired height.

Adjustment in range involves the determination of a setting which will cause the mean trajectory to pass thr the target, or, if this is not practicable, the range setting responding to the short and long limits of a bracket surely contains the target.

These adjustments are carried on simultaneously.

1296. The points of burst of a series of shots fired wit same data, even from a single gun, will vary in range, in tion, and in height of burst, due to inaccuracies of the nel and to variations in ammunition, matériel, and atmos conditions. Hence dispersion is to be normally expected. minor changes in firing data should not be based on the obse tion of a single shot.

A minor change is one which is less than the probable err

Deflection.

1297. When direct laying is employed, the executive m such changes in deflection as may be necessary to bring th of each gun to bear upon its proper portion of the target. shots go wide of the target it should be more accurately d nated.

1298. It may often occur that, though the initial dire has been given by direct laying, yet the gunner, on accou smoke, haze, or the indistinctness of the target, is unable qui to locate it after looking away. Gunners should, in conseq be trained always to note some mark on the ground which enable them either to find the target or to bring their guns

ıe initial direction by using this mark as a registration mark. owever, the conditions are such as to render it probable that y or inaccuracy will thus be occasioned, the captain should nce change from direct to indirect laying.

299. When indirect laying is employed, the officer conduct- the fire adjusts the sheaf.

300. To overcome observed errors in direction, the error of piece which is most nearly directed upon its proper part of target is measured or estimated in mils and a corresponding ection in deflection is applied in the appropriate sense. The ection is habitually applied in even multiples of 5 mils until roximate adjustment in direction is secured, when a correc- of less than 5 mils may, if necessary, be made.

301. Fire having been directed upon the target, it may be ted to another by increasing the deflection if the shift is ard the left, by decreasing if the shift is toward the right. he change in deflection necessary for this purpose is deter- ed by measuring the angle in mils between the old target and new and correcting it as though the old target were the ing point. Thus the parallax of both targets must be con- ered and, sometimes, their obliquity.

302. If salvos or shots are lost, one or more high-bursting apnel fired from the directing piece will permit the determina- ı and rectification of any error in deflection; or, in per- sion fire, the range may be changed to obtain impacts on orable ground.

Deflection Difference.

303. A change in deflection difference is based on the obser- lon of the preceding salvo. It should be made on the piece ich. for that salvo, is nearest to its proper direction on the get or on which the deflection is changed; and should be nounced ordinarily in the multiple of five nearest to the asured or estimated value.

304. As adjustment progresses the fire may be either con- ıtrated or distributed. If observation is difficult, concentra- n upon the most prominent part of the target may be ad-

visable; if at the same time a cross wind is blowing a point adjustment to the windward of the target may be selected. observation is easy and the front to be attacked is not great, fire may be distributed from the beginning, the direction distribution being such as to take advantage of any drift of smoke balls.

1305. If several batteries are adjusting simultaneously up a single broad target, then it is generally best for each to c centrate during the adjustment upon the corresponding part its section of the target—for example, the windward flank.

1306. The simultaneous adjustment of fire by several b teries upon the same target should not be attempted unless is possible to distinguish clearly the shots of the different b teries firing. If this condition is not fulfilled, the adjustm should be made by one battery only and verified by the others turn.

Height of Burst.

1307. For adjustment of time fire a low burst center gi a large percentage of bursts on graze is desirable. The opp tunity is thus given to observe both bursts in air and burs on graze. The visibility of the former is little affected by th profile of the ground and the state of the soil, and, *taken* i connection with the latter, they enable the observer to deter mine quickly the irregularities of the ground in front and rear of the target. Moreover, considerable effect may be pr duced during the adjusting series, and, by a small change in corrector, passage to fire for effect may be quickly accomplis

1308. When one-half of a salvo burst on graze and one- in air a mean height of burst of 0 mils is indicated.

When of a group of shots fired with the same data thr quarters burst in air and one-quarter on graze, a mean heig of burst of between 0 and 2 mils is indicated. In the reve case a mean height of between 0 and 2 mils below the ground indicated.

These conclusions will be modified if, in addition to the p portion of graze and air bursts, the actual heights of burst

sidered. For example, if three bursts are very high and a
:th is on graze, the latter should be disregarded. Thus
question of dispersion affects the conclusions as to the cor-
ion of height of burst that may be drawn from a comparison
he number of bursts in air and on graze.

309. When the mean point of burst is at a height appropri-
for adjustment, about one-third to one-half of the shrapnel
y, on account of errors of the fuze, of laying, etc., be ex-
ted to burst on graze.

o long as these proportions are maintained no change in
an height of burst for adjustment is in general advisable.

310. The apparent height will differ from the true height of
st if the observer's distance from the target is materially
erent from its range from the guns or if he is higher or lower
n the guns.

f he is nearer than the guns to the target, the apparent
ght will be greater than the true height; if he is farther away,
ill be less.

f he is higher than the guns, bursts in air beyond the target
l appear higher, burst in air short lower than they actually
. If he is lower than the guns, the reverse is the case.

The effect of such conditions must be fully considered in
:recting data.

311. Conclusions are to be formed from the observation of a
up of shrapnel fired with the same fuze setting, the average
ght of the bursts being considered. Hence battery salvos
ord the quickest and most reliable means of adjusting the
ght of burst.

312. Salvos in which the heights of burst are very irregular
uld not be considered. The irregularities are due to faults
the battery in setting scales and fuzes and in laying.

313. The height of burst may be regulated by changes of site
corrector.

314. If the first group of air bursts is too high for observa-
n of the smoke balls as to range, their mean height is meas-
ed or estimated and a change is made surely sufficient to
ing the burst center to the bottom of the target.

If the bursts are in air below, the burst center is similar brought to the bottom of the target.

If a target has been bracketed for height of burst, int mediate corrector settings are used for more accurate justment.

1315. Any increase of site raises the point of burst; any crease lowers it.

If the first salvo bursts on graze at 10 mils or more belo or at 15 mils or more above, an equal change in site should made to avoid the possibility of exceeding the limits of t corrector scale.

The measurements on which changes in site are based sh be as accurate as practicable.

1316. An impact over indicates that the time of burning too great and that if the trajectory were raised the point burst would be beyond the target.

An impact short, however, may not be followed by an burst short if the trajectory is elevated, for it is possible the corrector is much too low.

When the impact has been observed at a considerable dista short of the target, it may be expected, with good chance being correct, that the same corrector will give a burst sh after the trajectory has been raised.

1317. The advisability of raising the burst center when bo rounds of a platoon salvo burst on graze is much less than the case when all rounds of a battery salvo burst on graze.

1318. When the site is correct, if all the bursts of the 5 salvo are on graze below or on graze not more than 2 above the target the corrector should be raised, using a mul of 5. If, after raising the corrector, grazes are still obtained corrector should be raised by similiar changes from salv salvo until air bursts are obtained.

If all the bursts of the first salvo are on graze more tha mils above the target, the corrector should not be changed the next salvo.

1319. Changes in the corrector of 2 mils or less should based on the observation of at least four air bursts.

320. When indirect laying is employed, an error in the site l cause a corresponding and equal error in height of bursts. the cause of the latter error may not at first be known, adtment of the height of burst by changing the corrector may attempted. If the error in height of burst is not great, it y readily be allowed for in this way; but if it is seen that necessary correction will exceed the limits of the corrector le, the total correction which has been applied to the cortor must be transferred in the same sense to the site, and a urn to a corrector setting near the normal must be made.

The foregoing emphasizes the importance of determining the as accurately as possible in the first place. It also shows t when the firing data for indirect laying are passed from a tery in action to one just about to take part, not only the ge, but also the corrector and site which have been used h that range in securing the adjustment must be communied.

Range.

321. Adjustment for range is usually the most difficult to tain. One reason for this is that while nearly all rounds fired e observed for direction, distribution, and height of burst, only out 50 per cent of all rounds fired for adjustment on fairly ficult terrain are correctly observed for range. Increased ility and skill in making correct observations for range lead quicker and more accurate adjustment.

322. The depth of effect from a single shrapnel is small, as also the radius of action of the shell.

323. Against targets without depth there is always a single st effective range. Due to the inherent errors of the matériel, errors of even well-trained personnel, to the difficulty of mak; correct observations, and to the fact that most targets do ve depth, it is, however, seldom possible to determine one gun nge exactly appropriate to a target when using time fire. oreover, the tactical situation frequently, if not usually, imses conditions demanding greater or less rapidity in obtaining ect. In all cases accurate adjustment of fire to the narrowest

possible limits results in increased effect and saving of a
munition.

1324. The refinement to which fire for adjustment can
carried depends to a great extent on the tactical conditio
But tactical conditions also influence the degree of accuracy wi
which the fire may be adjusted. For example, the lack
visibility of the target or other conditions affecting observati
may oblige the acceptance of a more or less uncertain adjus
ment. Many targets are able to shelter themselves from fi
Hence early physical effect must be obtained unless mo
effect only is sought. In time fire there is necessarily a mom
when adjustment must cease, for the most suitable height
burst for producing effect is not a suitable height for observ
for range. For all those reasons, then, adjustment for ra
usually consists in determining two ranges, one of which is l
than the true range of the target and one of which is grea
This method determines a **bracket** within which there is s
certainty of the target being located. The measure of this
tainty is dependent upon the number of correct observatio
either limit. The depth of the bracket to be sought and the
tainty with which the bracket actually contains the target d
pend upon the technical and tactical conditions and upon th
kind of fire used. The same conditions which justify seekin
a narrow bracket justify or even require an endeavor to obtain
sufficient number of correct observations to make it practicall
certain that such a bracket contains the target.

1325. Thus there are two questions influencing the degree
which adjustment should be carried. Is it preferable to obt
a very powerful effect, without much regard to time, wit
comparatively small amount of ammunition? Or, will it
best to obtain a sufficient effect in a short time without mu
regard to ammunition? In any case it is to be remembered th
a poorly adjusted fire is ineffective.

1326. When a narrow bracket is sought, adjustment sho
be carried sufficiently far to give confidence that it actua
contains the target. On the other hand contentment wit
wide bracket, except when such a bracket is imposed by di

ties of observation, etc., implies that the definite establishnt of the bracket through the correct observation for range several rounds at each limit is not justifiable if time is reby sacrificed.

1327. If the target is surely included within the limits of the cket finally accepted, it may be reached more or less ectively by subsequent fire. The first consideration, then, is determine that fire at a certain range is surely short of the rget, and that fire at another and longer range is surely over e target. A second but very important consideration is to duce the difference between those two bracketing ranges as *ch as* possible; that is, to obtain the smallest bracket comtible with the circumstances of the case.

1328. If the first range is **short**, the range is increased; if er, it is decreased and rounds are fired successively, increased decreased in range, as the case may be, until the target is acketed.

Having bracketed the target, the size of the bracket may be ccessively reduced by halving the last bracket obtained; that by firing at the mean of the last two bracketing ranges.

1329. The amount of changes in range for obtaining the first racket depends upon the accuracy of preparation of fire and ie nature of the target.

1330. When ranges are estimated or taken from a map on hich the positions of guns and target can not be accurately cated, the first bracket should be obtained by changes of 400 rds.

When an accurate range finder has been expertly used, or hen the range has been accurately determined by other means, 00-yard changes are appropriate.

1331. In firing over friendly troops near the target the racket may be obtained by smaller successive changes of range.

1332. No burst should be sensed unless the officer conducting ie fire obtains from it information sufficient to form the basis or a definite opinion. If there is any doubt in his mind, the urst should be sensed as **doubtful.** Having once sensed a burst s **short** or **over,** the captain should not hesitate to base a change

of range on such sensing; but whenever time or the condition of observation permit the limits of the brackets, particularly the short limit, should be based upon the sensing of three or more bursts.

1333. Correctly observed bursts indicate a short range more surely when they are low; a long range is more certain when the correctly observed bursts are high.

1334. If the sense of the bursts is doubtful, or if the bursts are lost, circumstances must decide whether to change the range or to change only other firing data for the next round.

If the smoke of the fire of other batteries has interfered with observation, a salvo concentrated upon some prominent part of the target may be of assistance.

If the doubt was occasioned by the fact that the bursts were in air and high, it may be well merely to lower the point of burst for the next salvo.

If a salvo is lost, the projectiles have probably burst wide of the target or in a ravine or behind some intervening cover. If the smoke of the bursts does not rise and become visible after a few seconds, the lay of the ground should determine whether to increase or diminish the range or merely to raise the corrector so as to obtain visible bursts in air. Definite information may generally be most quickly obtained in such cases by securing time bursts just above the level of the crests or other cover.

1335. The trajectory may be brought upon the target by changing the site or by diminishing or increasing the range setting. In the latter case, if the site is in error the fuze will be set for a range other than the true range to the target, its time of burning will be too short or too long, and the projectile will burst too high or too low, as the case may be. Modifications of the corrector or of the site will in general be necessary to bring the mean point of burst to the desired height. If the error has been small, it may readily be overcome by a proper use of the corrector.

Heights of burst varying greatly from those expected may be due to large changes in range or to changes in atmospheric

litions. However, when the approximate corrector setting nown, heights of burst which are apparently abnormal may ılly be attributed to an erroneous site. If the error has ı great, delay may result in the adjustment of height of ıt by the use of the corrector. In such a case it may be isable to change the site, for when it is considerably in r data obtained from firing at one target are of little as- ınce in ranging upon another. In general, the best results be obtained by changing that element which is most prob- ' wrong.

f the range has been determined by range finder or other ırate methods, the use of a correct site will greatly increase probability of early effect upon the target.

336. In the accurate adjustment of time fire, not only the ht but also the burst interval is important; for projectiles sting too far in front of the target and those bursting in air above it produces little or no effect. The burst interval orrect when both the range and the height of burst are cor- ly adjusted. Indications that such is the case are: (1) ıt the bursts on graze bracket the target; (2) that the mean ght of burst is about 3 miles; (3) that fragments from the bursts strike the ground both in front and rear of the tar- , and that the pattern made by these fragments, as revealed the dirt and dust knocked up, is close and dense rather than atly extended; (4) that obvious effect is produced upon the get.

f doubt exists as to the burst interval, it is best to lower the rector and get a group of low bursts or bursts on graze.

bservers posted well to the flank of the line of fire may be he greatest assistance in determining and correcting errors he burst interval.

337. At medium ranges a change of 4 mils in the site pro- es a change of about 100 yards in range; hence, if the site naterially altered, the adjustment of the range will have to recommenced.

338. At medium ranges a change of 4 points in the cor- tor produces a change of about 100 yards in burst range.

1339. If physical effect upon the target is observed, the ra used is approximately that of the target.

If a bracketing salvo is observed, the range is a little l if the bursts were in the air; approximately correct if bursts were on graze.

A mixed salvo over indicates too long a range. A mi salvo of air bursts short indicates an approximately cor range; of graze bursts short, a short range.

1340. The minimum bracket possible of determination pends upon the accuracy of the gun. The establishment bracket narrower than the 50 per cent zone is difficult.

The bracket to be used depends upon the tactical situa and conditions of observation.

1341. Against stationary targets—for example, artillery position or immobilized troops—a bracket of 100 yards sho ordinarily be sought.

Against targets moving slowly or capable of slow mot only—for example, heavy Artillery, troops in defiles, conv a bracket of 200 yards should be attempted.

Against transient targets—for example, Infantry in actio in bodies that can quickly disperse or seek cover, or machi guns firing—a bracket of 200 yards is usually the narrowes that can be attempted.

Against troops moving or likely to move rapidly in the direc tion of the range—for example, mounted troops not confine by the terrain—it is usually advisable to bracket by changes 600 yards in range and to attempt no narrowing of the brac thus obtained. If the target is approaching, and the long li of the bracket has been last determined, it is often advis to fire again at the short limit in order to make sure whether not the target has passed out of the bracket. If the target withdrawing and the short limit of the bracket has been l determined, it is often advisable similarly to make certain the long limit. The use of the range finder is especially imp tant in determining quickly whether a rapidly moving target approaching or withdrawing.

a reliable range is used, and the situation demands
ffect, a bracket of 400 to 600 yards may be assumed,
n the observation of the first salvo.

ist instantaneous targets—for example, observation
or staffs—no bracket is sought, but time fire is executed
wide front and great depth at maximum rapidity.

. Unless there is actual necessity for early effect, the
mit of a bracket should be based on the observation of
an one round.

. It is always permissible in shrapnel fire to base the
nit of a bracket upon a smaller number of observations
necessary for the short limit.

. As the depth of the bracket decreases, so should the
of observations on which each limit is based increase.

. If percussion fire is to be used for effect on material
called **fire for demolition**, very accurate adjustment of
is required. Such fire is effective at all ranges but, be-
the probable error in deflection increases and the danger
decreases, while observation grows more difficult as the
becomes longer, effect can often be obtained at the longer
only at the expense of much ammunition.

adjustment on large targets may usually be determined
ie effect observed.

he demolition of Artillery matériel and other targets of
lef, the adjustment in range is never completed, but is
on to the end of fire for effect. When the 100-yard
is definitely determined by at least four observations of
fired at each of the limiting ranges, fire is continued at
d-range of the bracket. Here both **shorts** and **overs**
be observed, and fire is maintained until, of at least eight
tions, their numbers are found to be nearly equal or until
d preponderance of one over the other is established. So
the **overs** and **shorts** are nearly equal the adjustment
close and the range should not be changed. But as soon
er **shorts** or **overs** preponderate in a ratio greater than
he range is changed by 25 yards in the appropriate sense.
s less than 25 yards should not be made.

If at any range used before the 100-yard bracket is es lished, such results are observed as those discussed above the mid-range of the bracket, the subsequent precedure sh likewise depend upon the equality or preponderance of sh and overs. If they are equal, or if their ratio is not greater th 5 to 3, firing at that range is continued; if the preponder is greater than 5 to 3, the range is changed by 50 yards in appropriate sense, and adjustment is then continued as descri

Percussion fire may be said to be adjusted only when effect plainly observed, or when, of many rounds fired at a single ra the number of overs is equal to or slightly greater than the n ber of shorts.

Method of Fire.

1346. Often the method of fire most suitable for adjustm will conflict with the requirement of very early effect. Re ments of adjustment warn the adversary, thus remove the ment of surprise, and prompt him to measures to avoid los

Every means must be utilized to simplify the operation adjustment and shorten their duration.

Fugitive targets may be attacked with high chances of s cess if the fire is carefully prepared against points and are likely to be occupied and the data corrected from *time* to ti in accord with the results of actual firing.

1347. The rapidity of fire during adjustment will be c trolled by the necessity of observing the shots and setting the necessary corrections. Rapid and correct decisions quick commands on the part of the battery commander increase the rapidity of the adjustment of fire.

1348. The method of fire to be employed depends upon nature and situation of the target and upon the method of lay

Against stationary targets—for example, inanimate ob tives or troops intrenched or otherwise immobilized—or in re tration of fire the adjustment in range, in height of burst, in distribution is usually secured by salvos.

Against slowly moving targets also—for example, large bo in column of route or wagon trains—the adjustment is usu secured by salvos.

inst rapidly moving targets—for example, Cavalry charg-
Artillery changing position—the adjustment is secured
leys with direct laying, by volleys or salvos with indirect

inst transient targets—for example, Infantry in action
open or Infantry marching in small bodies or machine
iring—the adjustment is usually secured by salvos.

9. The kind of projectile to be used in adjustment is ordi-
the kind that is to be used for effect. The choice de-
upon the nature of the target and its situation.
ing fire for effect time fire is, as a rule, employed against
ite targets, aircraft, searchlights; percussion fire against
inanimate targets.

0. During adjustment it may become necessary to change
ime fire to percussion fire to lessen the probability of hit-
iendly troops or for the purpose of narrowing the bracket.

1. When fire has been adjusted with shrapnel and it is
ary to use shell the mid-range of the bracket is the most
priate and fire at that range should be continued until at
three rounds have been sensed.

2. It may be necessary in some cases to assign special
ts to certain pieces or to certain platoons. In such cases the
of section or the chief of platoon conducts the fire of his
r guns, unless the captain gives other instructions.

Adjustment from Aircraft.

3. When adjustment must be based on the results of ob-
ion communicated from aircraft the various elements of
data can not usually be corrected simultaneously. By
with a single piece the deflection may first be adjusted.
is followed by adjustment of the distribution. Then the
et for range is obtained. Finally, from a consideration of
itio between air and graze bursts the height of burst may
ablished.

ect can not be observed unless it be great but effectiveness
e may be inferred from the target's movement or effort to
n cover or from other indications.

Fire for Effect.

1354. Every target attacked will present its own pr which must be solved according to existing conditions a by adherence to any fixed rule.

1355. Having obtained the desired bracket, no time s be lost in making the area thus inclosed untenable for an tile force. The adjustment should be continued during fi effect by constant observation with a view of discarding a obviously ineffective, of confining the fire to ranges whi pear to be effective, and at the same time, of making suc rections in height of burst, deflection, and distribution a perfect the adjustment or meet changes in the location o mation of the target. It is to be expected that targets h mobility will not remain immobilized under effective fire. captain should, therefore, be ready to adapt his adjustm changing conditions at the target. It will seldom be p to spend sufficient time and ammunition to obtain an adju close enough to justify remaining at a single range du delivery of fire for effect.

Ranges may be considered effective when it is evident effect is being produced upon the target; when the great portion of bursts in air is short of the target and at the pr mean height; when the shrapnel cases are seen to strike a near the target; when dust, if seen at all, is knocked up by bullets both in front and in rear of the target.

1356. Only direct hits are effective against material ta or shielded batteries when percussion fire is used.

Range.

1357. In time fire, the short and long limits of the br determined during the initial adjustment should be consid as inclosing an area to be covered during fire for effect at cessive ranges. This can be accomplished by opening fire effect and using either successive increments or succe decrements so that the target will be covered at one or of the ranges used. The officer conducting fire may be al

an opinion as to which are the most effective ranges. The range differences should usually be 100 yards, but when area has been narrowed as a result of observation they may duced to 50 yards.

58. In firing at moving targets the first range used should arily be that limit of the bracket toward which the target ving.

e first range appropriate for other targets depends upon deration of the purposes of the fire for effect, the condi- of observation, the position of friendly troops.

59. A bracketing battery salvo indicates an effective range. a such a salvo gives sufficient indication of the corrector conditions demand immediate effect, fire for effect should ened at that range and reliance placed upon observation ch fire to determine whether or not it is actually effective. n the corrector is not established and when certainty of stment is more important than immediate effect, the adjust- should be continued, using the same range. In any case must be taken lest the bracketing salvo be due, in part at , to the obliquity of the target.

60. The uncertainty of a bracket may be compensated for earching a greater depth than that indicated by the observa- s, but the principle should only be applied to those cases anding immediate effect.

tactical or other conditions make it desirable to open fire effect upon a bracket the short limit of which is based upon observation of a single round, fire should be first delivered ughout the observed bracket. Observation of effect from at the short limit of the bracket indicates that the bracket propriate; if such effect is not observed, a range 100 yards t of the short limit must be included in the fire for effect.

61. In general, the seeking of a 200-yard bracket, or ter, indicates that fire for effect should be opened as soon ne observation at each limit has been obtained.

62. When the short limit of a 200-yard or greater bracket ased upon the observation of two or more rounds, a range t of the near limit is rarely necessary.

1363. Whatever the number of observations, it is not n sary to fire for effect with shrapnel to include ranges b the observed long limit. If the number of observed overs i the long limit may be included; and if the overs are les two, the long limit should be included, unless the bracket small as 100 yards or less.

1364. The searching of areas is never to be resorted to it can be definitely determined that the enemy is actually i within the area selected, and unless he would evidently e a material influence upon the progress of the combat i undisturbed by fire.

1365. When time fire over friendly troops must cease depend upon the range, the terrain, and the conditio observation.

In firing over friendly troops advancing to the assault at the target should cease upon a suitable signal fro Infantry that the fire is dangerous. The range may b creased to hinder the bringing up of hostile support cause losses should the enemy fall back.

At medium ranges over level ground the danger spa Infantry from well-adjusted time fire extends for a distan about 300 yards in front of the target. This distance bec less if the ground rises toward the target, greater *if it* toward it.

Height of Burst.

1366. If the adjustment of the distribution and of the h of burst have not been completed, bold changes with a v adjusting them should be made, the rate of fire for effect reduced, if necessary, to permit this adjustment.

If doubt is occasioned by the fact that other batteries firing at the same target, a salvo or volley with projectil type different from that in use by the other batteries usually be recognizable.

1367. When the height is maintained between 2 and 4 the effect varies but little. Outside of these limits the e diminishes very rapidly. A constant error of 3 mils in es

f height of burst is equivalent to the loss of several
is.

3. For effect, a height of burst which is somewhat low is
or to one which is somewhat high.

9. In passing from fire for adjustment to fire for effect
rrector should be raised by mils if during adjustment
have been three bursts below the target to one above
y 3 mils if the bursts below have been equal to those
the target. If only one round has burst below the
to three above, no change should be made in the corrector.

0. During time fire for effect about one-fifth to one-ninth
bursts should be on graze, and the greater the range the
r should be the proportion of graze bursts.

1. If the area to be searched is not deep and the slope not
a mean value of the site may be taken, and a corrector
which will give low bursts at the near limit of the area
e slope is away from the guns, and bursts slightly above
ormal if the slope is toward the guns. This method will
's be used if great rapidity is desired. For searching long
teep slopes, however, it is better to use the site of the
limit of the area to be searched and vary the corrector from
to volley or salvo to salvo, raising it if searching up the
or lowering it if searching down the slope.

Distribution.

2. Exact distribution facilitates observation of fire, in-
s probable effect, and indicates good fire discipline.

3. In fire for demolition, all projectiles which are not ex-
direction are lost.

fire against personnel, considerable latitude may be allowed
adjustment in direction.

4. The fire of a battery is usually distributed over the
assigned it for attack.

ien time fire is employed the following considerations are
borne in mind:

) If the front to be attacked does not much exceed 12 mils
idth, it is sufficient to converge upon the center of this

front, as the dispersion of fire, when a considerable numb rounds is fired, will provide for covering the full front.

(b) Fronts which do not much exceed 35 mils may be co effectively by a battery without sweeping.

(c) If the front much exceeds 35 mils, it may be divided sections and each section attacked in turn, or sweeping m employed. The choice depends upon the nature of the t and the circumstances of the case.

1375. In shrapnel time fire the right piece is directed no the right edge of the target but upon a point about 10 ya side of the right edge. To direct the left gun upon a corre ing point inside the left edge, the divisor of the front target is the number of guns firing, not that number dec by one (**1190**).

1376. Knowing the width of his target in mils, the b commander quickly decides whether to employ converging fire without sweeping, or fire with sweeping.

In the latter two cases he secures distribution by di each gun upon one-fourth of the front to be attacked.

If direct laying is to be employed, he indicates clearly to chiefs of section the outer limits of the target, if these limit not in themselves obvious; and each chief of section points to his gunner the part of the target on which his *gun is* to initially laid.

If indirect laying is to be employed, a distribution differe equal to one-fourth of the front in mils is used.

1377. When the mean height of burst of shrapnel is adjusted, each gun is expected to cover effectively a front yards if one round is fired, 25 if two are fired.

The construction of the carriage permits a traverse of 70 mils on either side of the axial line.

As sweeping fire is especially adapted for use in cases the fire has been carefully prepared upon definite hostile tions, time may be afforded for giving the initial direction the gun set at the extreme right traverse, if necessary. The traverse on the carriage may thus be utilized; but it is not

lated that a single gun will be given such a width of front
:ack as to make this necessary.

78. One turn of the traversing handwheel shifts the point
rst approximately 8 mils.

erefore, in sweeping fire the front in mils covered by each
e will be equal to eight times the number of rounds in the
p; the front in yards covered will depend upon the range.
e number of rounds to be fired in the sweep by turns of
handwheel is determined by dividing by 8 the number of
in the front assigned to each gun to attack. If the quotient
ined is not exact, but consists of a whole number and a
e fraction, then the next higher whole number is taken.

2,500 yards range well-adjusted sweeping fire will cover
front assigned completely. At longer ranges the front will
be completely covered, while at shorter ranges the sheaves
iccessive rounds will overlap.

or the attack of a large front two methods are applicable:
To divide the front up into equal parts and attack these
s in turn; (2) to form the sheaf at the outset so that it will
r the whole front and fire a sufficient number of rounds
eping to cover the entire front.

f volley fire is to be used, the circumstances must decide
ch method is preferable. If time is not afforded for delib-
e preparation, the first method is usually preferable; but
ime is thus afforded, then the second method may often be
nd advantageous.

f the target is very oblique, different ranges may be assigned
different guns.

379. Sweeping by turns of the handwheel is wasteful of am-
lition when there is lost motion in the traversing mechanism,
should not then be attempted.

380. Sweeping is preferably accomplished by the use of
its whose reticules have horizontal scales. Such scales are
duated in divisions of 5 mils, not numbered. At ranges up
2,500 yards the line of sight is shifted 10 mils to the left after
h round; above 2,500 yards each shift is by 5 mils.

The number of rounds required by this method is deter as for the other (1378), using as a divisor 10 or 5, as the may be, instead of 8.

1381. Not more than four rounds should ordinarily be fir any one volley sweeping.

1382. When percussion fire is employed, the nature of the get determines whether converging or distributed fire is t employed.

If the target to be attacked has a continuous front, e. g. obstacles, etc., this front may be divided up into sections mils each and the sections attacked in turn, each gun taki proportionate part. If the target has a much smaller than 10 mils, the fire may be converged upon its center. I target consists of artillery, each gun may be assigned a c sponding gun, depending upon the amount of artillery avail

Method of Fire.

1383. The rapidity with which fire for effect should be ducted depends principally upon the tactical situation. adjustment has been obtained the volume of fire may be creased by increasing the number of pieces or by firing in m rapid succession than is practicable during fire for adjustm or by increasing the number of rounds in each volley.

Rapidity of fire must never be so great as to prevent fuz being exactly set and the guns accurately laid, or otherwise interfere with the work of the gun squads.

Deliberate fire is more accurate than a more rapid fire.

Great rapidity of fire is permissible only for a short The expenditure of ammunition is otherwise too great.

1384. The rapidity of fire of independent guns or plato may be increased as much as possible to deceive the enemy garding the number of guns in action. At times it may advantageous to repeat the same range several times so as give the impression that volley fire is being used by one or m batteries.

1385. Fire by salvos or volleys at successive ranges per the captain to adapt the corrector to the slopes of the terrain.

86. Volley fire is adapted especially to the attack of fugi- targets that are more or less vulnerable. The special char- istic of this method of fire is its great flexibility and lity. The number of volleys to be fired, their range differ- the number of rounds in each volley, are all in the hands ie officer conducting the fire. By suitable manipulation of sheaf he may readily shift the fire from point to point of errain, as necessity may require, and by adapting the bursts 'e to meet the crises of the action he may utilize the ammu- n to the best advantage.

87. While salvos are adapted especially to securing the stment of fire, they may also be used for producing effect, cially with the idea of obtaining at the same time additional rmation on which to base a closer adjustment of the fire. are employed according to the principles of volley fire.

88. Fire at will is employed solely for the close defense of guns.

gainst a slowly moving enemy, such as infantry, the fire uld be commenced when he has arrived within about 350 ls of the gun; against a rapidly moving enemy, such as alry, when he has arrived within about 800 yards; the pur- e in both cases being surely to establish a fire-swept zone ough which the enemy must pass in order to reach the guns.

89. Against Infantry in position and more or less protected entrenchments the intensity of the fire should be regulated suit the necessities of the case, as our Infantry advances to attack, being slow or ceasing entirely while the enemy is ealed or inactive, rising to great intensity when the crises he action develop and the enemy exposes himself to meet a. Salvos may be used for the ordinary phases of the action, ys for the crises, the object being to assist our own Infantry nflicting as much damage as possible upon the enemy; by roying his morale; by forcing him to keep under cover; and reventing effective fire upon his part.

90. Against Artillery in position, the first object is to gain ascendancy over it by inflicting as much damage as possible n the personnel. Immediately effective fire is particularly

demanded if the enemy can be attacked at a disadvantage, for example, while limbering or unlimbering. Obtaining bracket as small as the conditions justify, searching the de of the bracket, carefully observing the fire, and securing promptly as possible an accurate adjustment are the means be ordinarily employed in attacking the personnel.

Due to the difficulty, however, of reaching effectively the p sonnel of batteries provided with shields and posted in mas positions, the struggle between evenly matched artilleries often be long drawn out. If the enemy's artillery is tempora overmatched, it may suspend its fire and shelter its person but it must be expected to renew the struggle as soon as pressure upon it is relieved. The aim must be to gain the su riority of fire by suitable concentrations of effect on the p of our own Artillery; the opportunity may then be gained destroy the enemy's matériel by well-adjusted shell fire.

1391. A slowly moving target, such as Infantry, or mou troops impeded in their march, may be quickly bracketed salvos and then attacked by searching fire.

Infantry in march formation may be thus attacked, but i mediate deployment on their part is to be anticipated, and t officer conducting the fire should be prepared to reach the probably behind cover, with a well-distributed fire.

Infantry moving to attack in deployed lines, a succession thin lines, or in line of small columns may be met by volle successively reduced in range as the infantry approaches. their formation is in line of small columns, the fire should distributed so that a piece or platoon may bear upon each of columns.

At close ranges infantry will probably endeavor to adv by successive rushes from cover to cover. Such rushes may met by volleys previously prepared for upon selected positi evidently in the immediate path of the enemy. If the positi occupied by important bodies of the enemy during the inter of advance are well defined, accurately adjusted fire may brought to bear upon such positions, and the ground betw successive positions may be covered by searching fire when

ınt movements of the enemy from one position to another ıttempted.

92. In the case of a rapidly approaching or withdrawing ɛt, fire should be adjusted upon the target itself if prac- ɔle. A bracket of 600 yards will ordinarily be quickly ob- ɛd and volley fire at successive ranges will be opened. The ıl range for effect should be one toward which the target is ing, an ample allowance being made for the motion of the ɛt.

target having once been brought under effective fire, its ɛquent movements may be followed by volleys varying in ge and direction, according to the rate and direction of ch of the target.

adjustment upon the target is impracticable, some point or may be selected which the target is expected to pass. In case a broad bracket of the point or area is determined and for effect is opened when the target enters it.

393. The application of the methods of fire previously ex- ned should be practiced by the solution of theoretical and ·tical problems. The variety of such problems is so great examples of their solution can not be given to cover all sible cases.

Section XIII.—Units in Observation.

394. In preparation for definite and imminent phases of an on, certain bodies of Artillery may be ordered to observe the ny in designated portions of the terrain and be ready to g him under immediately effective fire.

possible, the position of the enemy is clearly pointed out; if his exact position within a certain area has not been de- ıined the area may be divided into sectors and a sector as- ɛd to each important group of artillery. In the former case firing data are determined for the known position of the my; in the latter case, for prominent features of the ter- ı within the sector assigned.

With a view of being prepared for instant action, the guns y be laid upon the target or upon some selected feature of

the terrain and the sheaf formed so as to provide for the des distribution.

1395. Trenches should be dug for the trails wide enough permit them to be shifted through the probable arc of fire.

The safe arc of fire may be taken as 45° on either side of normal to the battery front, the presumption being that guns are well aligned. In all cases, however, it is the duty the chiefs of section to see that their pieces are not fired w pointed at a dangerous angle with respect to other pieces.

1396. To form the sheaf, an aiming point is selected, a de tion is given the directing piece which will cause it to be rected upon its section of the target or upon the registra mark, and a deflection difference is employed which will se to distribute the fire over the desired front.

If the position of the enemy is known and all necessary d have been obtained, the pieces may be at once loaded.

If the exact position in which the enemy will appear is known, then on his appearance the necessary correction data must be quickly measured or estimated and set o the range finder can not be used, the correction in range is tained by estimating the target's distance from the selec registration marks; the correction in deflection by measur the angle from the registration mark to the section *of the* ta get which is to be attacked by the directing piece and correc ing it, if necessary (1196). The circumstances of the ca must decide whether the pieces are to be loaded before t target appears.

1397. In the general case the initial opening of the sheaf ing best promise of immediate observation of range is a d bution 10 mils greater than for parallel fire. Such a sheaf entirely precludes cross fire.

But in particular cases, when conditions are such as to in accuracy in determination of the deflection and deflection ference, the opening may be made suitable to the nature o target.

Thus, if the enemy's artillery is the expected target, a pa lel formation of the sheaf may be preferable; if lines of i

are to be attacked, a more open formation may be appro-
e; if the head of a column is expected to appear, a con-
ed sheaf may be suitable.

in order to assist our own Infantry, the Artillery is called
to repress the activity of a long line of hostile Infantry in
tion, each battery may be required to act over a wide front.
l judgment and great versatility in the employment of fire
called for under such circumstances, in order that the de-
l results may be obtained without undue expenditure of
unition in the earlier phases of the attack. Means may be
loyed to keep the entire hostile line under the menace of
single guns being freely used to repress special activity of
enemy in the sections assigned to such guns.

Section XIV.—Targets.

398. Targets usually belong to one of the following classes:
a) Obstacles, intrenchments.
b) Localities.
c) Woods.
d) Reconnaissance and staff parties.
e) Observers, signalmen, telephonists.
f) Cavalry.
g) Artillery.
h) Infantry.
i) Machine-gun groups.
k) Aerial targets.

Obstacles—Intrenchments.

399. Many obstacles may be destroyed by light artillery, but
ys at the price of a large expenditure of ammunition; they
attacked by high-explosive shell or percussion shrapnel.
efenders behind stone walls may best be reached by demoli-
of the walls.
arthworks can only be damaged. The fire directed on them
ld be destined only for the defenders who are sheltered by
n; percussion shrapnel or high-explosive shell will be used.

Localities.

1400. Localities are attacked with a view of inflicting lo on the troops that are believed to be assembled there, o render them untenable by the demolition of buildings, to w incendiary effect may sometimes be added.

They are attacked by the percussion fire of high-explo projectiles or by low bursting time shrapnel.

While light-artillery shell permits the accomplishment of result sought, the shell of heavy artillery containing more plosive can produce a greater disorganization of high substa buildings and of compact groups.

Woods.

1401. If the borders are occupied, woods are attacked time fire.

When it is desired to reach troops concealed in the int of a wood they are attacked with percussion fire.

Reconnaissance and Staff Parties.

1402. These are very important targets, vulnerable, but f nishing only fleeting opportunities.

Time fire is executed over a wide front, with a *long brac* and maximum rapidity.

Personnel of Command, Observers, Signalmen, Telephonists.

1403. These are important targets of variable vulnera They present a certain fixedness. The front covered is na and the bracket is reduced more and more. Time fire is followed by percussion fire if the target is on an obse ladder.

Cavalry.

1404. Cavalry is very vulnerable at a halt and when in formations. It protects itself against artillery fire throu mobility and dispersion.

the cohesion of the hostile cavalry is destroyed, and its dis-
on is compelled, the results may be considered as serious
and advantageous to the friendly Cavalry. If it suffers
losses in both men and horses and is put in fear of cross-
certain areas, the results will generally be the maximum
artillery may hope to secure.

this end, time or percussion fire is used, and all measures
taken to increase the rapidity of fire. If the firing unit is
placed so as to have a direct view of the target, the sheaf
pened and fire over a deep bracket is commenced when the
alry enters the area under observation. If direct laying
be used the target is followed by all the pieces, a wide
cket is sought and then searched by volley fire, commencing
he limit which the target is approaching.

he opportunity of firing on cavalry will be fugitive; the fire
hort duration. The maximum rapidity of fire is essential
ether by time or percussion. When Cavalry directs its at-
k against a battery, the battery will act advantageously in
ablishing a barrier by percussion or time fire in front of the
my's line.

Artillery.

405. Artillery presents targets widely varing in vulner-
lity.

The greatest vulnerability exists from the commencement of
reconnaissance until the occupation of the hostile position is
omplished; that is, up to the moment that the enemy's
illery is ready to fire.

Effective fire on reconnaissance parties may cause important
ays in the occupation of position by a battery, and may de-
ve that artillery of its commander or embarass communica-
n.

Effective fire at the moment of occupation of position by a
tery may produce losses and such disorder that it will only
over with difficulty. Its retirement from under fire is also
nost critical moment, especially when the retirement is made
an entire unit.

If the firing unit is in position and the hostile pieces are s at effective range, a great consumption of projectiles will n needed to destroy its matériel. The number of projectile quired to hit one of the carriages of a section varies with range and the conditions of observation. The average is a 15 or 30, according as the target is at 2,500 or 3,500 yards r Besides, fire for the demolition of matériel is effective a the personnel.

If the pieces are not seen, if they are at a distant r if the direction of the objective is known by its flashes or by the dust raised by its fire, fire for demolition can n employed without risking the expenditure of an unwarra number of projectiles; but such artillery has nevertheles certain vulnerability to time fire. There are always obser who are incompletely sheltered and who are less so, gener when the artillery is firing. Furthermore, the shields will confer absolute protection on all who are sheltered by t The effect obtainable from time fire is increased when th teries against which it is directed are under an oblique Finally, impact bursts may reach the cannoneers whatever be their position.

A sufficient recession from the covering crest or from t mask renders an objective absolutely immune; for it *is* impo sible to attack an indefinite depth of terrain. On the oth hand, the greater the distance from the mask which the ene is forced to take the more difficult become hostile communi tion and command. It is advisable to form an opinion, fro indications observable, as to the depth of the zone that reasonably be supposed to contain the target. In certain this will be definitely known, in others simply estimated. conclusion will indicate the expenditure of ammunition may be required to produce a probable effect. The urgen producing the probable effect will govern the decision.

1406. The varying conditions indicate the following princi governing conduct of fire against an artillery target.

If priority in occupation of position is obtained, careful servation is made of indications of the enemy's reconnais

occupation of positions. At the moment of these opera-
time fire is opened through a large bracket, over a broad
, at maximum rapidity. This will be repeated, if neces-
the adjustment being refined.
priority of occupation is not obtained, or if the opportunity
ring at the moment of hostile reconnaissance and occupa-
of position has been allowed to pass a different procedure
visable.
hen the pieces of the hostile artillery are visible, time fire
ld be used at first to reach the uncovered personnel and to
uce a demoralizing effect. This effect is then extended to
personnel under cover by the use of time fire, the limits
he bracket being reduced as much as possible, and the
covered being limited to the actual front of the target. The
t is continued to destroy the personnel and then the
olition of the matériel by percussion fire is attempted. Fire
elivered on all visible pieces as accurately as possible and
inued until the results sought are obtained, unless another
ck should demand the attention of the battery, or unless
scarcity of ammunition demands the exercise of economy
hat respect, or unless the range is so great as to prevent
carrying out of fire for demolition. In such a case a sub-
of the battery may remain ready to fire should the target
in manifest activity.
When the hostile pieces are not visible their presence may
disclosed by the flashes, by the dust raised by fire or by
er indications. The method of attacking them is similar to
just described, except that study of maps and terrain
t be made to establish the far limit of the bracket, the near
t being the covering mask, and that fire for demolition can
be usually undertaken. If it proves impossible to reduce
limits of such a bracket, and should there be uncertainty
o the effect produced on the target, it is advisable to await
appearance of new indications. These should be most
efully observed in order to take advantage of any oppor-
ity that may be offered. The firing unit remains in observa-
n of the target and a minute search is made for its observers

or its battery commander's station. If these are discov efforts should be made to destroy them.

1407. Fire for demolition requires great accuracy in r and direction, thereby necessitating careful observation of round from each piece. Its employment is permissible only the nature of the target indicates that fire for demolition be carried out and when the number of batteries at han such as to limit the front to be attacked to about 100 y per battery. If the target is such that fire for demolition admissible, one battery will give a sufficient volume of shrapnel fire against an artillery target, however dense it be, provided the front does not exceed 200 yards.

Infantry.

1408. Infantry, like artillery, offers targets of variable nerability. But while the artillery of the enemy once in constitutes a definite target, whose only important mo tions are that it may pass from action to inaction, she or exposing more or less of the personnel, the infantry changes form, dimensions, density, and sometimes position one instance to another. An artillery target may someti be destroyed; it is practically impossible to destroy a body infantry, whose elements avoid fire individually and *may* tain fire almost without loss.

Finally, it may be said that artillery is proportionally small quantity, and that, by reason of the power of even a single p each unit or subunit which is seen or is firing is of sufficient portance to be attacked, while the Infantry exists in very numbers, is almost everywhere, but is in fractions of smal portance. Because of their weakness these small fracti not attract fire, or by their multiplicity oblige those who to fire against them to disperse their fire. Fire against fantry targets will often fail to produce great losses, but results may be expected.

On the defensive, the assailant may be obliged to deploy distance, to scatter his units, to seek defiladed routes, to tate to traverse the fire-swept zones or to traverse them

ous loss. Later our own Infantry by stopping the enemy ·ansform him into a fixed target of considerable density ılnerability.

the **offensive**, the defender may be held to his cover, pre- l from firing when it is to his interest to do so, deprived › use of certain points of support, and restrained in the ve use of his supports and reserves.

9. Generally such results will be obtained by firing a few :tiles at a time, using the proper method of fire, as often ›ortunities offer, taking into consideration the amount of ınition on hand, the rapidity of progress of the general ı, and the approach of the assault.

the crisis approaches, the Infantry will become more and numerous until the height of the combat is reached. In not to develop uselessly all the Artillery and to have all ırtillery ready to resist surprises, it will be advantageous, ng as the situation is not fully developed, to engage against nfantry and Artillery only the necessary number of guns. ıe use of suitable units and methods of fire, and by firing ›n one part then on another part of the front assigned him, ıtain may effectively attack infantry operating on a front ›n 300 to 600 yards.

e to the great variety of cases which may arise, only the general instructions can be laid down for the conduct of against Infantry. The best guaranty of well-conducted is to be found in the ability of the captain. He should self-reliance, good judgment, keen tactical sense, quick ion, thorough knowledge of the capabilities of the matériel reat experience in command.

Machine Guns.

10. Machine-gun groups have much the nature of infantry king, but they are of greater importance than small frac- of infantry on account of their great volume of fire. If are discovered to be firing they should be attacked with fire over a broad front and a deep bracket. Under the best itions of observation from a station near the guns the

bracket can not usually be reduced below 200 yards. Owi
the ability of the personnel to disperse and to seek cover,
fire must be rapid. Once forced to cease firing, the area
taining the machine guns should be kept under close obs
tion, with a view of preventing resumption of their servi
their withdrawal for use elsewhere.

Aerial Targets.

1411. Fire against targets in the air generally requires
assignment of particular units to the purpose, the diggi
circular trenches about 36 inches deep for the trail
permit the use of high angles of elevation, the provision, if
ticable, of platforms for the carriages, and the organizati
a system of lateral observation with means of sure com
cation between observers and battery commander's station.

1412. Captive balloons are very vulnerable within the
of the trajectory and the action of the fuzes. They have
motion within narrow limits, and are attacked by direct
with time shrapnel. It is indispensable that the rounds
rect for deflection. Ranging is commenced, unless the range
be measured, at the long limit of the fuze to ascertain wh
the balloon is within time-fire distance, and the bracket
obtained and fire for effect conducted by the *usual metho*
except that for effect the burst height should be greater th
normal to insure wide dispersion in the shrapnel cone. Wh
range finder is used, a bracket may be assumed on the ba
the first observations for range.

Dirigibles and aeroplanes are vulnerable. Direct lay
used with time shrapnel. Each platoon is fired separately,
beginning at the far limit, the other at the short limit, of an
mated bracket as wide as 2,000 or 3,000 yards. Each
volleys of one or two rounds at ranges differing by 200 y
the successive ranges approaching the center of the bra
When the bracket has been covered or when lateral observa
indicate that the target is out of the bracket the proce
repeated.

the range finder is used, a narrower bracket may be at-
ed.

aircraft may readily change their direction, height, and
. deflection and corrector changes will usually be necessary
ıg firing. Essentials of success are rapidity and accuracy
rvice of the piece, skillful operation of the range finder,
on the part of the officers conducting the fire, quick decision
ommand and boldness in changing ranges without delay.

Targets with Respect to Terrain.

13. Targets may also be considered with respect to the
e of the terrain on which they are situated.

enemy entering the dead space existing in front of a bat-
can not be attacked by ordinary means. Some effect may
tained by causing the projectile to burst on the trajectory
h corresponds to the minimum range. This may be done
ising the corrector by 5 points at a time. If the corrector
is not sufficient, it may be left constant, and the expedient
be used of increasing the site by successive increments of 5
each and by decreasing the range 200 yards for each incre-
of 5 mils. This decreases the range to point of burst by
mount roughly corresponding to an equal change of the cor-
r. This kind of fire is appreciably effective only within
narrow limits.

ıe effect is always inferior to that obtainable with the true
ctory of the target and is dependent upon the minimum
e and the profile of the terrain below the trajectory. On a
ontal terrain with site 0, range 2,000, the effect may be
derable, even when the target is under the highest part of
rajectory. If the range is greater than 2,000 yards, and
urst center is raised, the effect decreases rapidly and ceases
appreciable when the target has penetrated the dead space
y short distance.

the terrain falls off abruptly beyond the mask, the mini-
ı range at which effect may be obtained by the above
ıods rapidly decreases.

1414. A target scattered over a glacis sloping down tow the battery can not be equally affected by time fire in all parts unless the points of burst are kept at a constant effective height above the terrain. This may be realized simultaneous changes of the range and corrector in the s sense. The relation between the variations of the two elem is not constant but depends on the inclination of the glacis. may be best controlled by careful observation of the propor of bursts obtained on graze.

The case is similar if it is attempted to follow a target u down such a slope.

Difficulties may usually be avoided without great loss of e tiveness by adjusting the corrector on a point at mid-heigh the slope and using it unchanged until the site has been co erably altered.

1415. A target marked by a crest may always be attacked though it had considerable depth. To overcome the effect of slope of the terrain increases of range must be accomp by lowering of the corrector. The steeper the slope the le the range be changed and the more the corrector.

For example, if the terrain has a slope of 60 mils, increa the range setting by 50 yards and lowering the corrector 2 mils will increase the burst range by about 100 yards; if t slope is 90 mils, a range increase of 25 yards and a correct diminution of 3 mils will cause a change of about 100 yards burst range. The height of burst above the point of imp will not be materially changed in either case.

If percussion fire is used, range changes to correspond t yard bounds on flat terrain must be less than 100 yards, amount depending upon the steepness of the slope. S greater than the angle of fall can not be struck by percu fire.

1416. Percussion fire of shrapnel may be very effective ag animate objects beyond a crest on slopes giving bursts on t chet. At 3,000 yards ricochet may be expected from slope 50 mils or more. The slope most favorable for effect is o about 115 mils. However, both ricochets and effect are gr

nced by the character of the soil. When effect by such
an be obtained it is possible to avoid complicated changes
rector to overcome the influence of slopes.

17. Against a target whose elements are at the same range
a different planes of site the site is varied among the guns.
ainst a target whose elements are in the same plane of site
at different ranges the elevations of the pieces may be
d correspondingly. But this must be regarded as excep-
l, a suitable method of attack being by successive volleys,
less than the usual range changes, throughout the bracket
sing the whole target.

SECTION XV.—FIRING IN THE BATTALION.

18. The duties of the battalion commander are mainly tac-

e informs the battery commanders as to the tactical situa-
, the mission of the battalion, and the rôle of each battery.
more detailed this information the more surely may the
or rely upon correct initiative by his captains when com-
ication fails.

**19. The rôle assigned to a battery should be given broadly,
ing to the captain within his sphere a full power of initiative
fixing upon him a definite responsibility.**

20. The major should conserve his force by assigning to a
ticular task only so many of his units as should accomplish
with their maximum power. He may thus be able to retain
his disposal other units to meet contingencies not yet
eloped.

21. In some cases, as when the major is far away from a
ery commander's station, the designation of a target will be
difficult. The use of two or more easily identified reference
nts facilitates the designation of objectives. But it may be
essary for the major to calculate the firing data for his posi-
and to transform it for use at the captain's station.

22. It is certain that under fire communication will be in-
upted or at least delayed. It may be renewed during lulls

in the action. Rapid and effective communication requires that the major and his captains easily understand one another. To that common, concise expressions for identical thoughts be practiced. This becomes particularly necessary in order that the major may be replaced by one of the captains without causing failure of fire direction.

It is likewise necessary that the personnel be imbued with a common doctrine of offense and defense and have a thorough knowledge of the conduct of fire appropriate to various tactical

Under such conditions only may the action of the battalion be expected to proceed with the greatest effectiveness and without demoralizing interference of higher commanders in the conduct of fire.

1423. During adjustment the battalion commander's duties will usually be limited at first to the correction of errors in identifying targets, and to the prevention of interference between the batteries. It will be impossible for him to follow the adjustment of more than one of his batteries.

As the action progresses he should form an opinion as to the effectiveness of the fire by particular batteries and upon particular targets. He must cause his captains to conform the rapidity and duration of their fire to the results that are desired. If he finds it necessary to intervene in the conduct of fire, he thereby assumes personal responsibility for the results.

In general, the major will devote his attention principally to the assignment of targets, to the observation and study of the terrain and of the situation; to the digestion of information received from higher commanders, friendly troops and auxiliary observers; to reports to the regimental commander regarding changes of the situation; to amplifying the information already furnished to his subordinates and to rendering them every possible assistance; to keeping open the lines of communication; to preparation for the effective use of unengaged batteries; to maintenance of the supply of ammunition.

1424. The simultaneous adjustment of two or more batteries upon a target or within a small area is very difficult. It should be avoided by adjustment in turn, or by the assignment of

adjusting points, when concentration of fire by several es becomes necessary. It is simplified by the transference ı from one battery to another and by the deliberate and le calculation of data.

stment upon a target already under fire for effect is still ifficult. Either the unit firing should increase the volume re sufficiently to accomplish the object desired or it should ring until the new unit has adjusted.

. Frequent changes of target materially reduce effect. in emergency, the mission of a battery at the moment be completed before a new target is assigned.

ight of a battery commander on his own responsibility to target to meet sudden changes in the situation, when nication has been interrupted or in the belief that the an not be early enough informed, should not be abridged.

SECTION XVI.—NIGHT FIRING.

. If the target area is illuminated by searchlights, firing conducted against targets of all kinds the same as by t up to the effective range of the lights. It will often ssary to fire as at instantaneous targets to take advan- brief periods of illumination.

. If searchlights are attached to an Artillery unit, they be established on high points well to the front and if possible. Telephonic communication should be estab- so that the light beam may be directed and held upon get. By using two searchlights the illumination may be ed or the illuminated area increased in size, or one may to search for targets while the other directs its beam ıe already under observation.

tacking searchlights the same methods are used as in ıg captive balloons.

. If searchlights are not available, preparation of fire if possible, be made before dark. Fire should be at t ranges, the number used depending upon the degree of y reached in preparation of fire, and upon the depth of a to be kept under fire.

1429. Preparation of fire will be most reliable if the ba or at least part of the guns, can be placed in position b dark. If this is not possible, the necessary measurement calculations must be made during daylight with the gr possible accuracy.

1430. Range and corrector setting are best obtained b for adjustment during the day. If this is impracticab range must be determined from the map or from range measurements. Heights of burst may be adjusted with cient accuracy at night, if the aiming circle or telescope set up and adjusted before dark.

1431. To permit of turning fire upon different targ areas, direction is taken by daylight to a principal regist point, using the guns themselves or the aiming circle angular distances from this point to the various targ target areas are then measured and recorded, and as breadth of front of each. If guns have been placed in tion, it is well to verify the directions by registration sh

1432. These data will be entered on a sketch; each t area will be designated by a letter, care being taken t letters of similar sound, and opposite each target will be the range, site, corrector setting, deflection from the re tion point, and breadth of front.

Copies of this sketch will be made for all Artillery com ers concerned. Additional copies will be given to aux observers, who will make their reports by reference to sketch, using lantern signals or wire communications.

The position will be reconnoitered by daylight, and the the front and the positions of the guns marked, prefer a white strip with short crosspieces.

If the preparations can not be made before dark, it is ticable to fire at all, except at illuminated targets. Fo purpose an auxiliary observer on a flank is necessary whose assistance a broad bracket is obtained, and fire fo opened upon the bracket with ranges differing by 10 Ranges should be eliminated or added, according to the of the auxiliary observer.

3. For night firing, stakes carrying lanterns may be pro- as aiming points. Similar stakes may be used by observ- fix the directions to targets. Sights must be illuminated.

CHAPTER VII.—TARGET PRACTICE.

4. Target practice includes—
Pistol practice.
Subcaliber practice.
Service practice.

Pistol Practice.

5. Pistol practice will be conducted as prescribed for Field ry in the Small-Arms Firing Manual.

Subcaliber Practice.

6. Subcaliber ammunition will be used for perfecting units discipline and for practicing officers and men in all the nisms of fire. To attain these ends, practice will be held rain where the strike of the bullets can be plainly seen he guns.

7. By reducing dimensions of targets, intervals, distances, nges to one-tenth of those met in service, very realistic tion of service conditions may often be obtained and tunity afforded for practice in using instruments and field s and in computing firing data under varied conditions.

Service Practice.

8. Organizations will be prepared for service practice by l and detailed preliminary instruction, during which the ions of paragraphs 1 to 3 will be kept constantly in view. eliminary training contemplates—

The study of principles and methods.

The training of organizations to a skillful and accurate mance of their duties.

The application of this training to the solution in the f problems simulating those met in war.

The successive steps to be followed in the training are: F the establishment of thorough fire discipline in the uni means of constant drill and subcaliber practice; second. cises in the field, in which technical problems are assumed. ing use of actual targets or of such natural features of landscape as may be available; third, the solution of tac problems of a character illustrating conditions of service in

1439. In order that all junior officers may receive the m mum instruction they will be required to command batteri drills and in tactical exercises involving the reconnois selection, and occupation of positions, the preparation of and the departure from positions.

1440. At service practice all officers who are not requir the service of the unit actually firing or who are not detail specific duties connected with the practice will be assembl some convenient point from which the fire may be observed where they will not interfere with the officers directing and ducting the fire. They will be informed regarding the tion and the targets, and will compute and record appr firing data. They will also record their observation round in range, height of burst and distribution, and changes of data based thereon. These records will be tak the subsequent critique and there discussed.

1441. No service practice will be held by any organiza unless suitable and ample terrain for the conduct of the tice in conformity with the spirit of this order is available. such terrain is not available, application will be made by Artillery commander to superior authority with a view of ing suitable terrain on which to hold the practice.

1442. The final results obtained in service firing sho regarded as showing to what extent the organization con is prepared to perform its duties under battle conditions. mental, battalion, and battery commanders must keep th in view during the period of preparatory training and als ing the practice, and make every effort to derive the gr possible advantage from the ammunition allotted to th spective organizations. This allowance will be expen

ms involving fire direction for field officers and conduct for battery and Artillery staff officers.

3. The senior Artillery officer present with an organiza- ill allot firing problems as follows:

To each officer commanding a battery at least three prob-

To the other officers present with or assigned to the ization for practice as many problems as the remaining nition will permit and in such proportion to these officers may consider to be for the best interest of the service. will also fix the maximum amount of ammunition to be ded in each day's firing.

4. Exercises for colonels and lieutenant colonels will in- the preparation of problems, and where two battalions, real resented, are available, the execution of problems in which will reconnoiter and select positions for the battalions, lish communication with the battalion commanders and an assumed higher commander, and arrange with the for the supply of ammunition. In the exercise of fire ion and supervision of fire they will issue such orders and ictions as will cause the batteries to fire on their proper ts in accordance with assumed varying phases of the em.

blems for majors, where they supervise and direct the fire, e the same as for colonels. Where they direct the fire as lion commanders under supervision of the regimental com- er they will reconnoiter the position assigned the battalion, nate the position to be occupied by and assign the proper to each battery, establish the required communications, a position to the battalion combat train, arrange for the y of ammunition, establish auxiliary observers where neces- and practicable, establish the service of security where the ion requires it, and will, during the firing, send to the conducting the fire all available information to assist him operly carrying out his problem.

blems for captains and lieutenants will include the duties e battery commander in reconnoissance and in conduct of n targets designated by higher commanders.

In several of the problems the officer supervising the pra will arrange to outline the troops which the Field Artille supporting, to represent the ammunition trains by men material taken from organizations not participating in the lem, and to establish the required communications.

1445. In the course of each year's practice, all of the lems commonly met in war service should be illustrated. can be accomplished only by a systematic and methodical vance preparation of a schedule of firing exercises for the mand concerned. The progression should be from simple lems to the more difficult ones.

Each battery and battalion should have at least one ex yearly involving fire from more than one position, prefe with different methods of laying; each battalion at least exercise yearly involving the direction and conduct of fire its batteries simultaneously.

All problems of the same day should be based on a tactical situation.

1446. Complex problems should be distributed over of years.

1447. The amount of ammunition to be expended in problem will depend upon the principles which it is intended illustrate. Ordinarily the problem should proceed only *thro* adjustment and such other firing as is necessary to test conclusions reached by the officers conducting the fire. year, however, some practice in fire for effect by all the me isms of fire must also be conducted.

In the earlier problems allotted to officers the firing m conducted very slowly, discussion before assembled officers lowing each phase of the problem, such as the determinati firing data, methods of fire to be used, observation of fire. ing, changes of data, etc., before the next step in the probl taken. As skill is attained increase of speed must be ins upon.

Officers supervising or directing the fire should termin problem at any time when they consider that conduct of f

cient or when the principles involved have been demon-
ed.

48. When material targets are used, their dimensions, ap-
nce, and except for moving targets, their resistance to
should conform as closely as possible to the troops and
ial that they represent.

terial targets will be used for all direct laying and for all
or effect. In problems intended to be carried only through
tment of fire, targets may be merely assumed to exist.

targets are disposed in accordance with a tactical situation.

49. Ammunition chests will be packed as for active service
r as the ammunition on hand permits.

50. The senior Field Artillery officer will preside at critiques
ch day's firing.

51. Practice by battery will be supervised by battalion
anders and by regimental commanders; by battalion, by
ental commanders; by regiment, by brigade commanders
e senior field-artillery officer; by larger units and in the
combined, by higher commanders.

52. In the execution of problems, particularly during the
, losses of officers, men, and animals, injuries to matériel,
he necessity for ammunition resupply will be simulated
time to time.

53. The officer supervising the practice—

Will prepare in writing problems to be solved by the
directing the fire. The problems should involve the use
artillery units in as many of the different rôles to which
might be assigned in service as the allowance of ammuni-
vill permit.

Will provide a range officer and a range guard detailed
the artillery command, and preferably from units other
the ones taking part in the problems; will furnish the
officer with a copy of the problem, inform him as to the
and location of the targets required or that will be
ed, and in a general way indicate the position of the
ing station for the range party.

(*c*) Will provide assistant range officers, a safety officer, a timekeeper and inform them in sufficient time as to approximate position to be occupied by the battery whose they are to observe.

(*d*) Will inform the officer directing the fire, when other than himself, as to the time and place at which to report with his to receive the problem.

(*e*) Will, when more than one battery takes part, so arrange the execution of the problem that the fire of each battery may be observed and recorded separately, except in simultaneous firing.

(*f*) Will, immediately after each fire problem or after practice, conduct a general critique of the firing, pointing out errors of methods, observation, and judgment and giving a decision as to the conduct of the problem, conferring with the range observers if communication with them is established.

(*g*) Will, as soon as practicable after each day's practice, conduct a detailed critique of each problem fired, based on the various reports required. This critique will cover all the principles illustrated by maneuver or fire during the problems. It will include comments on such subjects as:

Condition of matériel and adjustment of sights and instruments.

Use of headquarters detachments and battery commanders' details.

Marking the route.

Reconnaissance of targets and position.

Selection of position.

Decision based on the tactical situation.

The service of security.

Assignment of units to particular tasks.

Communications.

Clearness and brevity of instructions given.

Designation of objectives.

Reconnaissance by battery commanders.

March discipline.

upation of positions.
preparation and use of cover.
ting of combat train and limbers.
tability of methods of fire.
e discipline.
ne consumed in—
1. Reconnaissance and selection of position.
2. Assignment of units to positions.
3. Occupation by each unit of its position.
4. Designation and identification of targets.
5. Opening fire.
6. Fire for adjustment.
7. Fire for effect.
ect obtained.
plenishment of ammunition.
vance or withdrawal from position.
curacy and completeness of records.
ee discussion will be encouraged during this critique in that all may profit from the mistakes made as well as by orrect methods employed.
e officer conducting the critique will express a definite ion as to merits of the various features of the problems and the time consumed.

54. Critiques should be short, good-tempered, impersonal, esting, lively, and instructive.
ntention, and hair-splitting discussion of far-fetched and points are exasperating and tiresome and therefore ful.
ents are discussed in the order of their occurrence.
at conducted after each problem is general in terms and s briefly the incidents of firing only while impressions are fresh in the mind. It clears the way for the subsequent lled critiques, which need not again touch upon the points sed of except in the direction of such elaboration and ection as are made necessary by the practice reports. At the r critique each commander who has had to do with a phase

of the problem should give a brief sketch of his execution the orders received, followed by a frank statement of the er made of which he is conscious. The officer conducting critique will then clear up any doubtful circumstances by a priate questions and will discuss the important features of problem. Criticism must be well-founded and just. Violati of principles laid down in these regulations must be consid faulty, but in differences of opinion as to the suitability to situation of alternative authorized methods the comment s be explanatory and advisory.

1455. The officer directing the fire—

(*a*) Will, in general, be responsible for the tactical hand of the problem.

(*b*) Will make such arrangements as are necessary to h his unit at the proper time at the location designated by t officer supervising the practice for receiving the problem.

(*c*) May, if he considers it advisable, when the officer c ducting the fire has reported the data he used in the simu fire for effect, order verifying salvos or fire for effect t allowance of ammunition for the problem is not the exceeded.

1456. The officer conducting the fire—

(*a*) Will, on receiving instructions from the officer *directi* the fire, proceed with the solutions of the problem with th ammunition allotted.

(*b*) Will, when directed not to proceed beyond the adju ment of fire, order the fire to cease when adjustment suited the situation has been obtained, and then execute a simul fire for effect. If the officer directing the fire is not in a p tion to hear the commands for simulated fire, the conductor fire will have them communicated to him at once.

1457. The range officer—

Will report for instructions to the officer supervising t practice and with his range party will prepare, place in po tions indicated, and, when necessary, operate the targets pr scribed. He will observe and report upon the firing and subm at the conclusion of the day's practice the prescribed reports

r the purpose of securing safety of the range during firing, s responsible—

) That the terrain in the line of fire is examined before g commences, and that all people and live stock are excluded kept therefrom.

) That guards are posted so as to cover all approaches to sector of fire, which includes the terrain from the guns to arget as well as the danger zone beyond the target.

) That the guards are properly instructed as to their duties. instruction he will give in person.

) That whenever the firing should be stopped on account anger on the range, a **red** flag is displayed where the officer ucting the fire can see it.

) That when the range is clear a **white** flag is displayed.

458. The assistant range officer No. 1—

a) Will report to the officer supervising the fire for instruc- s.

b) Will provide himself with the necessary instruments and ks, and be, at the proper time, at the position of the battery se fire he is to observe.

c) Will inform himself as to the target assigned and observe n a position as near the battery as practicable and record height of the burst above bottom of target in mils.

459. The assistant range officer No. 2—

a) Will report to the officer supervising the fire for instruc- s.

b) Will provide himself with the necessary instruments l blanks, and be, at the proper time, at the position of the tery whose fire he is to observe.

c) Will inform himself as to the target assigned and observe, ord, and, in collaboration with the range officer, plot the dis- ution of shots with reference to the target and the line tery target.

460. The safety officer—

Will report for instructions to the officer supervising the prac- and will have the "**red**" flag raised and lowered as directed.

For the purpose of securing safety he is responsible—

(*a*) That no command is given for firing while the range as far as visible to him, is not clear, nor unless white flag is displayed by the range officer.

(*b*) That before firing commences, and during its continuance a "red" flag is displayed near the guns where it can be seen the range officer.

(*c*) That the direction in which the pieces are laid does endanger the range or observing parties.

1461. The timekeeper will record the times necessary to determine the data referred to in section (*g*), paragraph 1453.

1462. All individuals in the military service who see that firing is about to take place which would be dangerous, will call out promptly "Cease firing" in a loud tone of voice, and if at a distance from the battery, make the prescribed signal therefor. **The red flag in all cases indicates danger; the white flag that the range is clear.**

1463. All persons not a part of the personnel of the battery firing except the officer supervising the practice and his assistants are forbidden to communicate with any of the persons connected with the practice except to stop the firing in case of danger.

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OFFICE OF THE CHIEF OF STAFF

PROVISIONAL
Drill and Service Regulations for Field Artillery

(Horse and Light)

1916

VOLUME IV

Part X

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ıe following provisional system of Drill and Service Regu-
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H. L. SCOTT,
Major General, Chief of Staff.

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PART X.

ARTILLERY IN THE FIELD.

HAPTER I.—EMPLOYMENT OF FIELD ARTILLERY.

SECTION I.—CHARACTERISTICS OF THE ARM.

464. The characteristics of Field Artillery are:

. Great power concentrated in a relatively small tactical t.

. Rapidity of fire.

. Long range.

. Ability to act from concealed positions.

he first characteristic facilitates intelligent direction. It bles a commander to hold a powerful force well in hand and ring it to bear with the desired intensity at the proper place l time.

he second characteristic enables Artillery to bring a crushing to bear upon a vulnerable enemy before he can escape from action.

he third characteristic permits Artillery great freedom of ion, enabling it to interpose effectively over a broad terrain l to secure the concentration of effort of widely dispersed ts.

he fourth characteristic facilitates establishing the guns in orable positions, acting by surprise, preserving freedom of neuver, and makes it possible for inferior artillery to remain the battle field.

ield Artillery, on the other hand, has certain limitations ich prevent its employment as an independent, self-sustaining n. Among these may be mentioned:

(*a*) It is unable to act otherwise than by fire.

(*b*) It is extremely vulnerable when exposed in the open to percussion fire at medium ranges; also if exposed to shrapnel fire when in route formation or when in the act of occupying a position, as it can protect itself only with difficulty by fire action, concealment, or escape.

(*c*) Even when unlimbered it defends itself with difficulty against attacks on its flanks or rear.

The tactics of Field Artillery are based upon its characteristic properties and limitations and upon its employment as an auxiliary to the other arms in battle.

SECTION II.—PRINCIPLES.

1465. The exact method of employing Field Artillery depends as for the other arms, upon the particular tactical situation and upon the plan decided upon by the commander of the troops. The commander of the troops, the artillery commander, and regimental and battalion commanders must clearly indicate to their respective subordinates the objects to be accomplished. Technical details should, as far as possible, be left to subordinates, so that superior commanders may be free to follow the developments of the action and to apply the means at their disposal most advantageously in meeting the various conditions. The ends to be attained and the methods of attaining those ends vary with the nature of the action, as well as with each particular phase thereof.

The principles set forth in these regulations are the general guides of action. By study and reflection these principles are assimilated; by practice in applying them to real or assumed conditions the habit of prompt and correct action is acquired. To the professional readiness thus obtained must be added loyalty in carrying out the plans of a superior, skill in recognizing and seizing opportunities, and determination to win at any cost.

36. **Cooperation.**—Artillery has in general no independent on the battle field. Its sole object is to assist the other

secure decisive results, troops must advance, occupy the le position and by vigorous pursuit destroy or throw into ision the hostile forces. The isolated and independent ac- of Artillery leads to no decisive results. Close cooperation een the Artillery and the troops which it supports is, then, sary for effective action. To insure this there must not be a mutual understanding of each other's methods of n, powers, and limitations, and sure and rapid means of nunication between the various elements concerned, but should be a preliminary conference between the Infantry Artillery commanders concerned as to the definite plans of , their expected development and the actual means of com- ication to be employed.

fantry which is engaged must be accompanied by Artil- officers and scouts, who will communicate to the Artillery mander changes in the situation and the needs of the ntry. Artillery assists the forward movement of the other s by keeping down the hostile fire directed upon its own ps. This end is best accomplished through the infliction of sical losses upon the important parts of the hostile forces. the case of two opposing forces neither of which is able the time being definitely to assume the offensive, the power- and continued action of the Artillery may be necessary letermine upon and to prepare the way for the forward ement of the troops.

467. **Unity of direction.**—Whenever Artillery is used, a de- ve effect is usually intended. Its influence is powerful in portion to the timeliness with which it is brought to bear. characteristic properties of Artillery permit its fire to be dily shifted from place to place and to be concentrated or tributed as circumstances require. Effect is ordinarily se- ed by concentration upon targets which are at the moment

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WAR DEPARTMENT,
OFFICE OF THE CHIEF OF STAFF,
Washington, April 19, 1916.

ıe following provisional system of Drill and Service Regu-
ns for Field Artillery (Horse and Light), 1916, is approved
herewith published for the information and government
ıe Regular Army and the Organized Militia of the United
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' order of the Secretary of War:

H. L. SCOTT,
Major General, Chief of Staff.

To facilitate the work of preparation, the duties assigned Artillery in observation or readiness are made as definite as conditions will permit. Thus, the terrain in which the en is expected to appear may be divided up into sectors and a sector may be assigned to a given unit. Moreover, both in preparatory and the later phases of an action special du may be assigned to particular batteries.

For example:

1. To fire upon the hostile Artillery. Such batteries called counter batteries. This designation may be made viously to opening the engagement, in order that the ho Artillery may be discovered and fired on before it can seri enter the engagement, or it may be made after a portion of hostile Artillery has become effective and it is necessar overpower it and keep it under subjection. The term, the distinctive of those batteries whose special function it combat the enemy's Artillery.

2. To prepare and support the Infantry attack. These teries are called Infantry batteries and include those ass to the direct support of our Infantry, assisting it by firi the hostile Infantry, by opening breaches in the enemy's or by otherwise facilitating the advance. The Infantry batt are under the protection of the counter batteries, and inc the so-called batteries of preparation, which fire on the opp Infantry, and the breaching batteries, whose mission is to by their fire passages in the enemy's line through which troops may advance.

3. To be prepared to meet a counter attack. Such bat are called batteries of the counter attack. Batteries of counter attack are posted in observation, or readiness, fully watch the terrain, and assist in defeating any co attack the enemy may make.

4. To advance to the close support of the Infantry a These batteries are called accompanying batteries. The accompanying batteries must not be too narrowly inter as meaning an actual presence of the accompanying batter

e Infantry firing line, for in reality these batteries accom-
ny with fire rather than by actual movements of the guns.
tteries may, however, be actually moved forward when by
ch forward movement a distinct and positive advantage will
obtained or the morale of the Infantry be materially in-
ased.

5. To come to the assistance of other batteries. Batteries
signated for this duty are called reenforcing batteries; such
tteries may have been previously held in observation or
ıdiness, may have just arrived on the field or been called in
m an adjacent sector.

3. To draw the fire of the enemy's Artillery which has not
closed itself. Such a battery is called a decoy battery. It
usually placed in an advanced position with wide intervals,
l acts with great rapidity of fire so as to lead the enemy
believe he is opposed by a much larger force, thus inducing
n to disclose his position.

The above examples must not be construed as authorizing
igid, unchanging division of duties. Individual batteries may
called upon to perform, during the course of an engagement,
of the functions indicated.

The superior Field Artillery commanders must follow closely
developments of the action and make such modifications in
duties to be performed and the sectors to be covered as will
ke is possible quickly to concentrate the maximum obtain-
e fire upon the targets which at any particular time are most
ngerous to our infantry.

470. Employment of fire.—The power of Artillery should not
frittered away in desultory bombardments nor upon unim-
tant targets. Its employment is to be adapted to the phases
n action, so that it may exert the strongest influence upon
important objectives and at the critical moments.

he opportunities of striking an enemy while he is vulnerable
ordinarily intermittent and brief. They occur, for example,
n the enemy moves from cover to cover, or when he exposes
self in order to contend effectively against our own troops

Suddenness of action is thus often a necessity. If the act is also by surprise, effect, especially the moral effect, is creased.

The outbursts of rapid fire called for will therefore be in mittent, depending upon the nature and phase of the combat.

A prolonged deliberate fire, however, may be requisite for stroying material objects; for holding a sheltered enemy un subjection, preventing his supply and reenforcement, and cluding his effective interposition in the engagement; for sea ing for an enemy's reserves, etc.

Opportunities for using flanking and oblique fire must sought.

These methods of action are made possible and effective timely reconnaissance, by skillful selection and occupation positions, by careful preparation, and an efficient conduct of and by thorough cooperation between the Artillery and troops it is ordered to support.

1471. Economy of ammunition.—It is made the duty of ev Field Artillery commander to exercise constant and unremitt care to economize ammunition. Ammunition is to be economi by carrying the adjustment to the degree of certainty permi by the conditions and especially by not firing on small and un portant targets. Fire when once opened must be sufficient produce the result required but all officers must, by car supervision and observation, aid in preventing extravagant penditures.

SECTION III.—ASSIGNMENT TO DETACHED ORGANIZATIONS

1472. For suitable assignment of Field Artillery to protec and reconnaissance bodies, such as advance and rear guards outposts, subdivision of units must frequently be recommen by the senior Artillery officer but decided upon and ordered the commander of the troops.

In making such assignments complete organizations shoul taken, as a battery, a battalion, or a regiment.

173. The composition and strength of an advance guard is ndent upon the size of the command it is to cover, its special es and the tactical situation.

hether or not it should contain Artillery is a matter of esti- ion and decision in each particular case.

general, a division is the smallest unit employing Field llery in its advance guard. If combat is imminent or strong stance is expected a battalion is usually the proper unit for dvance guard consisting of two regiments or a brigade of ntry. A regiment of Artillery will unduly separate the ntry elements of the advance guard and interfere with unity irection, and its presence may cause the advance guard to ge in a combat not contemplated by the division com- der.

here may be special cases when such a large assignment is er, as, for example, an advance to a specially prepared or nnoitered position, or an advance behind an efficient cavalry en, but care should be taken not to overburden an advance d with an unnecessary amount of Field Artillery.

single battery is generally not enough if serious resistance pected, but there may be cases where one is sufficient for the nce guard of a division, as where the resistance takes the of annoyances and delays by small hostile bodies.

single battery may be assigned to the advance guard of a forced brigade under special conditions. In smaller detach- ts than this, road spaces and distances are so small that ing is gained by marching any Field Artillery in the ad- e guard, while security requires that it march with the main

174. In a pursuit Field Artillery, owing to its long range, ld be liberally supplied to the advance elements of all of pursuing bodies. In such cases its most effective use will gainst the flanks of the retreating columns. With Cavalry ts Field Artillery units can occupy positions for this, but regard must be paid to the enemy's ability to make sudden sive returns.

1475. Field Artillery should not ordinarily be assigned to mere train guards or rear troops intended for protection against hostile mounted troops.

A fighting rear guard protecting the retreat of the main body should have Field Artillery.

A rear guard covering the retreat of a defeated force should have assigned to it practically all of the guns of the command or they should be so marched that they are available for the prompt reenforcement, as they are a powerful auxiliary in forcing a deployment or otherwise delaying pursuing troops.

1476. A battery is usually sufficient Artillery for a flank guard not larger than a regiment of Infantry, and a battalion for a flank guard consisting of two regiments or an Infantry brigade.

In nearly all cases a command having out a flank guard has also an advance or a rear guard, and care must be exercised that unity of direction is not sacrificed by dividing the Field Artillery too much among the three bodies.

1477. Field Artillery is not ordinarily assigned to outposts for night duty when the command is making daily marches. The necessity for such use is exceptional, and as the animals must remain harnessed if not actually hitched all night this duty is very fatiguing.

If a daybreak attack on the outposts is anticipated, positions for the Artillery units should be reconnoitered and the routes thereto marked. Dawn should then find the Artillery ready to support the outpost.

Artillery is particularly useful to outposts when its fire can cover defiles or sweep large open spaces and when it commands positions that may be occupied by hostile Artillery.

1478. When any Field Artillery unit is assigned to an advance, rear, or flank guard, the unit continues to be a part of such command until specifically relieved or until march conditions are ordered terminated.

79. Field Artillery ordered to support certain units of command remains under the orders of the senior Artillery ander.

80. In defensive positions, Field Artillery units are usually ned by the general commander to sections of the line of se and placed under the actual command of the officers nanding the sections.

81. Horse Artillery only should ordinarily be assigned to lry commands. But if Horse Artillery be lacking, there ld be no hesitation in attaching Light Artillery units to lry in special situations, such as a pursuit, or a Cavalry chment covering the retreat of a defeated force.

82. Field Artillery assigned to advance or flank guards ld ordinarily be so assigned intact—that is, with its com- trains. In the case of rear guards, outposts, and special lry commands, the particular conditions will frequently rant sending only the firing batteries.

SECTION IV.—LEADERSHIP.

83. The art of leadership of Field Artillery troops consists ie application of sound tactical and technical principles to rete cases in service.

84. These regulations enunciate certain tactical and tech- principals for the handling of Field Artillery in the field. e principles are the result of experience, test, and careful ideration of fundamentals. Experience has proven that a ition of these accepted principles generally leads to in- ency. The principles should therefore never be violated. arry out these principles certain rules and regulations of ing rigidity are prescribed. These rules are guides, but may be construed liberally or even disregarded provided principle involved is not violated.

or example: It is prescribed that the lines of communica- between all of the elements of a Field Artillery command

shall be established from the senior to the junior, or from t top downward. The principle here involved is that all of t elements of a command must be in communication with t next higher element. The rule for the establishment of t communication is that the senior connects with the jun In exceptional cases, a battery commander may be ordered establish or of his own volition may establish communicat with his battalion commander. Here is a decided depart from the rule, but the integrity of the principle of comm cation is maintained.

1485. An assimilation of these fundamental principles and the rules for their application, an accurate and detailed kn edge of the matériel and its powers and limitations, com with self-reliance, initiative, and a conception of teamw are the fundamental characteristics of successful leader of Field Artillery.

1486. A correct grasp of the situation is essential to rea decision and to formulate a definite plan of action. The t element which enters every problem in the field will no permit delay of the decision until everything is known. T time allowable for decision decreases with the size of t command. Battery commanders, especially, must freque make immediate decisions on very little information, and the conduct of fire their decisions must frequently be inst taneous. The ideal decision and plan can never be attai Intelligence, unflagging zeal, and the constant solution problems of varying natures enable a leader to approxim the ideal solution.

1487. The prompt transmission of a clear understanding the plan to those subordinates charged with its execution secondary in importance only to the plan itself. This is essential part of leadership. Experience has shown that t most difficult of attainment and therefore requires spe study and constant practice.

1488. A good plan once adopted and its execution inaugur should not be abandoned for any other plan, whatever

lise, unless it becomes clear that the original plan can succeed. It is more difficult to arrest or change a plan begun than it is to initiate one. Afterthoughts are dangerous except as they aid in the execution of the original plan.

89. Complicated plans are not likely to succeed in war. plans and the methods adopted for carrying them into t must be simple and direct.

90. Order and cohesion within the units and communica- with the units must be maintained if success is to be cted.

91. Commanders must show themselves to be true leaders. must act in accordance with the spirit of their orders. interest must be eliminated from their calculations.

92. The best results are obtained when leaders know the city and traits of those whom they command; hence tasks ld be assigned with due regard to the capacity of individ-, and in making detachments units should not be broken or a disposition ordered that will cause an intermingling nits.

93. The authority of commanders should be exercised with ness, kindness, and justice. Discipline should be strict not tyrannical. Punishments must conform to law, and w offenses as promptly as the circumstances will permit. nnical or capricious conduct and the use of abusive lan-e is not only forbidden but weakens the authority of a nander. Courtesy to subordinates is as indispensable as tesy to superiors.

94. Commanders should exhaust every effort to keep their nands properly equipped. In order to lighten the severe sical strain inseparable from service in campaign, efforts t be made to spare the troops and animals unnecessary lship and fatigue; but when necessity arises the limit of rance must be exacted.

95. The latitude allowed to subordinate commanders is in et proportion to the size of their commands. Each leader ld see to the execution of his task, leaving to the proper

subordinates the execution of details and interfering only when mistakes are made that threaten seriously to prejudice the general plan. Where the troops of different units come in contact with each other, the leader must indicate a dividing line or one task must be subordinated to another by a definite order.

1496. This method of leadership requires that subordinates be not only acquainted with the decision and plan of the commander and the particular task assigned, but, in order to induce self-reliant action on his part, the subordinate must from the beginning be kept informed as to so much of the situation as may have a bearing upon his actions.

Statements intended to justify a course of action are evidence of weakness and mental indecision. Garrulousness, verbose argument, and discussion with subordinates weaken authority and should be avoided.

1497. True leadership will not knowingly employ ambiguous terms in the expression of orders or wishes. The desirable must be clearly expressed and whether or not it is to be attained by all means. A firm resolution must be always apparent in written or verbal orders and in the demeanor of the leader.

1498. Command in war demands the utmost tact, wise self-restraint, and rigorous clearness. The problem of command is not only to move troops and place them for action; its task is the wider one of causing self-reliant action on the part of the subordinate leaders, of directing the spiritual forces of command in the right direction and of concentrating the combined physical, mental, and moral energies of the command upon the attainment of the end indicated by the superior commander, which must be clearly and unmistakably communicated to all concerned.

SECTION V.—TEAMWORK.

1499. The greater part of any Field Artillery command goes into action and remains under the immediate control of responsible officers. However, in reconnaissance work, in the ad-

ion-supply service, and even in the batteries when communi-
ions fail or emergencies suddenly occur subordinates will be
own upon their own responsibilities.

Subordinates must therefore be given great latitude in the
cution of their tasks. The success of the whole depends
gely upon how well each subordinate coordinates his work
h the general plan.

500. In a given situation it is far better to do any intelligent
ng consistent with the forceful execution of the general plan,
n to search hesitatingly for the ideal. This is the true rule
conduct for subordinates who are required to act upon their
1 initiative.

A subordinate who is reasonably sure that his intended action
uch as would be ordered by the commander, were the latter
sent and in possession of the facts, has enough encourage-
nt to go ahead confidently. He must possess the loyalty to
ry out the plans of his superior and the keenness to recog-
e and to seize opportunities to further the general plan.

501. Initiative must not become license. Regardless of the
aber of subordinates who are apparently supreme in their
restricted spheres, there is but one battle and but one
reme will to which all must conform.
very subordinate must therefore work for the general result,
does all in his power to insure cooperation between the
livisions under his command. He transmits important in-
nation to adjoining units or to superiors, and, with the
stance of information received, keeps himself and his sub-
nates duly posted as to the situation.

502. When circumstances render it impracticable to consult
authority issuing an order, officers should not hesitate to
r from such order when it is clearly based upon an incorrect
r of the situation, is impossible of execution, or has been
[ered impracticable on account of changes which have oc-
ed since its promulgation. In the application of this rule
responsibility for mistakes rests upon the subordinate, but

unwillingness to assume responsibility on proper occasions indicative of weakness.

Superiors should be careful not to censure an apparent d obedience where the act was done in the proper spirit and advance the general plan.

1503. All officers and noncommissioned officers seize eve opportunity to exercise the functions consistent with th grade, and all assist in the maintenance of order and control.

Every lull in the action should be utilized for as compl restoration of order as the conditions permit, for the resup of ammunition, for overhauling communications, and for p viding concealment and cover.

1504. Any officer or noncommissioned officer who beco separated from his proper unit and can not rejoin must at place himself and his command at the disposal of the ne higher commander.

Anyone having completed an assigned task must seek rejoin his proper command. Failing in this, he should join nearest Artillery engaged with the enemy.

Soldiers are taught the necessity of remaining with t batteries, but those who become detached must join the ne command and serve with it until the battle is over or reor zation is ordered.

SECTION VI.—FIELD ORDERS.

General Considerations.

1505. The object of field orders is to bring about a co action in accordance with the intention of the leader. to the occasion, by insuring the cooperation of the vario ments of the command in the execution of a mission.

This involves a preliminary consideration of all the c stances which necessitate a course of action, commonly the **estimate of the situation**, a logical conclusion base such estimate, commonly called the **decision**, a **plan of a**

y out the decision, and a statement, written or oral, of the sion and plan, which statement constitutes the order. henever possible the formation of the plan is preceded by rsonal reconnaissance of the terrain.

506. In service, the time available for estimation of the ation, formation of a plan, formulation of the order and its smission to subordinates will vary greatly from hours to ites and even to seconds. By constant practice with all ner of technical and tactical problems under varying con- ns, officers must habituate themselves to a rapid process of rate reasoning, to the quick enunciation of clear and com- ensive orders and commands, and to resolute action.

Composition of the Order.

07. A decision having been reached and a plan of action ed, the first step is a consideration of how much of the in- ation upon which this decision and plan are based should ven out, and how much is necessary for that understanding bordinates which insures their intelligent cooperation. In gencies this part of the order may have to be omitted, due e necessity for prompt action, but when time permits it d habitually be done, and, when it must be omitted, the pportunity to inform the command should be seized. If ange in the situation has occurred it is best so to state, re has been a material change in the situation and no s are necessary, it is still well to communicate this infor- n at seasonable moments and thus to keep the command ntly advised. Care must be exercised in publishing dis- ng or discouraging news likely to impair the morale of the and.

second part of the order in logical sequence is the state- of the plan of the commander. As a rule this should be By itself, it would ordinarily convey little definite infor- to a subordinate as to his own course of action. It , however, be unmistakable and unequivocal and express he decision of the commander.

The third part of the order contains the disposition decided upon to carry out the decision expressed in the second part. It should therefore be the logical outgrowth of the preceding part and is in reality a continuation or supplement to that part. It is generally not sufficient to tell each subordinate his part of the program only. Successful cooperation and self-reliance require that each subordinate be acquainted with the part assigned to the others. This part usually contains orders for the next lower tactical units only.

The fourth part of the order contains such instructions as do not strictly pertain to the preceding part and instructions to parts of the command not involved directly in the tactical or technical part of the plan, such as trains, sanitary units, etc.

The fifth part of the order gives the location of the commander or of headquarters, or the point to which messages and reports are to be sent. It also informs as to the location of lines of information, if any have been established.

1508. Field orders to a command of any size logically fall into the five parts above mentioned or become what may be called the **five-paragraph order.** It is a logical model to follow in both written and verbal orders, as its form is such as to secure and insure consideration of all essential tactical matters both on the part of the one issuing the order and on the part of the recipients.

Every leader must follow a logical system for forming orders, practice it until it becomes second nature, and habitually follow his accepted system. In this way only will he be reasonably certain that his orders cover all that is necessary.

1509. Clear and concise instructions are given as to the action to be taken in the combat by each part of the command. In this way the commander assigns tasks, fronts, objectives, sectors, or areas, etc., in accordance with his plan. The terms employed convey definite ideas and leave no room for the conduct of subordinates will generally be correct and satisfactory.

10. When issuing orders, a commander should indicate
ly what is to be done by each subordinate, but not how it
be done. He should not encroach upon the functions of
bordinate by prescribing details of execution unless he
;ood reason to doubt the ability or judgment of the sub-
ate, and can not substitute another.
hough general in its terms, an order must be definite and
be the expression of a fixed decision. Ambiguity or
ness indicates either vacillation or the inability to for-
e orders.

1. Usually the orders of a commander are intended for,
e given to, the commanders of the next lower units, but
emergency a commander should not hesitate to give
directly to any subordinate. In such case he should
tly inform the immediate commander concerned.

2. Combat orders should prescribe communication, recon-
ace, flank protection, etc., when some special disposition
red or when an omission on the part of a subordinate
asonably be feared.

3. Arguments, reasons, conjectures, or any part of the
process entering into the estimate have no place in a
rder. Facts, or what are supposed to be facts, and
instructions only, should be incorporated.

Inistrative details should be covered in separate orders
when circumstances require that they be included in
l order.

Orders issued by subordinates should not be mere
ons of those from higher authority with additions of
wn. New orders are generally clearer and more satis-
though in giving verbal orders it is frequently desirable
any written orders from superior authority.

The initial combat orders of the Field Artillery brigade
ally written. The written order is preferable and is
henever time permits. If time permits, subsequent or-
e likewise written, either as field orders or as messages.

Written orders should be so distinct as to be legible even in bad light. Sentences should be short. Geographical names are spelled in ROMAN CAPITALS. Where the spelling does not conform to the pronunciation, the latter is shown phonetically in parentheses. When two or more places on the map have the same name, they must be identified by reference to other points. A road is designated by connecting two or more names of places on the road by dashes.

1516. The initial combat orders of regiments and smaller units are given verbally. For this purpose the subordinates for whom the orders are intended are assembled, if practicable, at a place from which the situation and plan can be explained.

Subsequent orders are verbal or in the form of verbal or written messages. Verbal messages should not be used unless they are short and unmistakable.

CHAPTER II.—INFORMATION SERVICE.

SECTION I.—DUTIES AND PERSONNEL.

1517. The functions of this service are: (1) To secure information which will favor the movement and employment of the guns; (2) to maintain communication between the various commanders concerned; (3) to provide for the security of the Field Artillery when such security is not provided by the other arms.

Information is usually secured by reconnaissance officers and scouts. Communication is usually maintained by agents acting as couriers or by signalers, using visual signals, the telephone or the buzzer. The duties of the two classes are apt to merge into each other and no sharp line of distinction can be drawn between the duties to be performed by the different individuals.

1518. The probable movement of guns and probable occasions for their employment should, so far as possible, be foreseen and special information secured beforehand to facilitate such movement or employment. Thus, on first approaching the scene of expected action, reconnaissance officers and scouts should be pushed well ahead to examine the terrain and to gain early

ı with the tactical situation. They should thus be prepared ırnish the Field Artillery commander with information h will assist him in making recommendations as to the ng of the Artillery. After the positions are selected the ınaissance officers and scouts should secure further detailed ·mation, such as firing data, appropriate routes for approach- ınd occupying the selected positions, etc., and should be pre- d to guide battalions and batteries to their appointed posi- ;. During the progress of the action this personnel is em- ɔd to prepare for further movements; to examine positions y, under certain contingencies, to be occupied; to act as liary observers, reporting on movements of the enemy or ur own troops, and on changes necessary in the adjustment re; to maintain communication between the Field Artillery Infantry commanders, etc.

519. Communication must be maintained: (*a*) Between the ɔrior commander and the Field Artillery commander; (*b*) veen the units of Field Artillery and the Infantry which they immediately assisting; (*c*) between the elements of the ld Artillery itself.

a) As a rule, the Field Artillery commander accompanies the ımander of the troops during the earlier stages of an engage- ıt and receives the orders of such superior commander in per- . As the engagement progresses it may be necessary for the ld Artillery commander to establish his position at a point er than that selected as the position of the commander of the ɔps. In such cases the duty of maintaining communication ween the superior commander and the Field Artillery com- nder devolves, in general, upon the Signal Corps. If, how- r, the Signal Corps is for any reason unable to supply such ımunication, or if it is not ordered, the Field Artillery com- nder furnishes the personnel and matériel necessary to main- n connection with the superior commander. In every case of ɔence, the Field Artillery commander is invariably represented the headquarters of the superior commander by an agent ɔignated from the Field Artillery personnel for the purpose.

(b) When a given force of Field Artillery is told off to re... support to an Infantry command in either attack or defense. ... Artillery commander should be informed as to the plan of ... Infantry commander, and the two commanders should arra... by conference beforehand the definite means of communicati... methods, etc., to be used to insure close cooperation. To ins... effective cooperation it is essential that the Field Artillery ... kept informed as to the losses sustained by the Infantry, ... particular part of the hostile line from which the fire cau... the greatest losses comes, the movements and any change... plan of our Infantry, also as to when it is necessary to be... increase the rate of, or cease firing. An Artillery reconn... sance officer with Artillery scouts, or Artillery scouts alone, ... be employed to establish the requisite means of communicat... which may be by courier, signals, telephone, or buzzer. ... reconnaissance officer and scouts also report on the effect of ... Field Artillery fire and furnish such other technical data as ... may be able to obtain. It may frequently be necessary for ... Infantry to furnish additional means of communication. Es... cially is this necessary during the last moments of an ass... when previously concerted signals for the cessation or shift... of Field Artillery fire must, as a rule, be given from the ... fantry firing line.

(c) Communication between the various elements of the F... Artillery is maintained by members of the headquarters c... pany and special details.

1520. The personnel assigned to regimental and batta... headquarters for the performance of the duty of informa... and communication is shown in paragraphs 588 and 569. ... agents are designated in time of peace, and, while ordina... remaining on duty with their respective batteries or batta... sections of the headquarters company, they report to the r... mental or battalion commander at all regimental or batta... formations.

a each battery two corporals are detailed as battery scouts one corporal and two first-class privates are detailed as tery signalers.

t each Field Artillery brigade headquarters, the brigade adnt acts as reconnaissance officer and the two aides-de-camp agents.

521. In general, commanders of Field Artillery brigades, iments, and battalions employ the members of their own dquarters detachments and of the Headquarters Company securing the information required at their headquarters and transmitting information and orders to the next lower commanders. When necessary, however, brigade and regimental amanders call upon the next lower units for details to assist securing information or in transmitting information and lers. Thus, when extensive reconnaissance is necessary for aining information upon which to base his recommendations the preliminary deployment of the Field Artillery, the gade commander may call for details of reconnaissance officers and scouts, to be employed under the immediate direction the brigade reconnaissance officer. When such a reconnaisce has been made, the employment of the guns is usually ilitated by assigning organizations to positions which have n covered during the preliminary reconnaissance by the cers and scouts detailed from the particular organizations. Within the battalion the battery reconnaissance officers are bitually employed under the direction of the major during preliminary reconnaissance and as long thereafter as their vices may be required.

1522. The exact manner in which a headquarters detachment the men of the Headquarters Company should be employed pends upon circumstances. To meet the requirements of the erage case the members of the detachment are assigned normal duties in accordance with the individual aptitudes of the n; but each man, including mounted orderlies, saddlers, etc.,

should be so instructed as to be available at any time to assist in the duty which is then most important.

Regimental and battalion sergeants major, as assistants to reconnaissance officers, should be experts in all the duties involved.

1523. As a rule, the battery acts as a part of a battalion and scout duty at a distance from the position is, so far as practicable, performed by the battalion scouts; the battery scouts should, however, be thoroughly trained not only as scouts but also as agents, signalers, and in the use of the service buzzer.

1524. In each headquarters detachment or Headquarters Company the men employed on the less-important duties and the substitutes for the more-important positions, the vacancies in less-important positions being filled by men selected from the batteries.

In each battery two details, a permanent and a substitute, will be trained.

Each headquarters detachment is instructed by its adjutant.

During periods devoted to individual instruction, the battery details, both permanent and substitute, will be instructed under the close supervision of the battery commander by the lieutenant designated as battery reconnaissance officer. During the latter parts of such periods of instruction battery reconnaissance officers and their details will be instructed by the battalion adjutant under the supervision of the major.

Battalion and regimental commanders give such instruction and exercise such supervision as may be necessary to insure proper training and the development of uniform methods in signaling, telephoning, and telegraphing.

During the period devoted to battery instruction the battery signalers should be frequently assembled for practicing intra-battalion or intraregimental communication. Advantage must be taken of terrain exercises without troops, and of all battalion and regimental exercises, to train and develop the entire personnel pertaining to the information service.

SECTION II.—DUTIES OF SCOUTS.

525. To secure information which will facilitate the move-
t and the employment of Artillery is the special function of
llery scouts.
he movement of Artillery is facilitated, for example, by
rmining the practicability of a given route; by exploring a
ion of country and selecting the best routes for traversing
by locating any bodies of the enemy which might obstruct
movement, etc.
ie employment of Artillery is facilitated, for example, by
rmining the dispositions of the enemy, the dispositions of
own troops, and such changes in these dispositions as may
r from time to time during the progress of an action; by
rving the effect of our fire and indicating, if necessary, cor-
ons which will insure its proper adjustment; by reporting
arrival of hostile parties within dangerous proximity of
rtillery position, etc.
e special functions of scouts are, then, to reconnoiter, to
ve, to report.
26. On minor duties scouts may operate singly. Ordinarily,
ver they operate in pairs and accompany a reconnaissance
. When operating in pairs without a reconnaissance
, one of the scouts devotes his special attention to gain-
he desired information, the other looks out for safety,
track of the route followed, and watches for signals from
nit to which the scouts belong or from neighboring scouts,

specially important cases a patrol consisting of a number
uts under a reconnaissance officer may be employed.
uts operate according to the rules laid down for patrols
ld Service Regulations, so far as these rules are appli-
to their more restricted functions. When sent on a duty
re to be given explicit instructions as to the information
ed, as to the place for reporting, and as to the time avail-
or securing the desired information. Full latitude is to

be allowed them in the choice of ways and means to carry o
the duties imposed.

1527. The nature of some of the duties to be performed b
scouts is indicated below:

1. In reconnoitering a designated road the scout prepar
himself to report especially upon: Its general practicabil
for Artillery; pioneer work needed, if any; condition of t
road as affecting rate of march; strength of bridges; t
existence of defiles on the road, such as causeways, bridg
narrow valleys, etc.; practicability in general of leaving t
road and moving across adjacent country; existence of int
secting roads, with direction and destination.

2. In selecting a route to a given point the scout endeav
first to get a good view of the terrain. If no road exists in t
desired direction, he studies the lay of the ground and jud
where the most practicable route will be. If possible, h
selects certain landmarks on the proposed route, from wh
good views can apparently be obtained, and proceeds rapi
from one to another, studying the country as he moves. Ha
ing determined a practicable line of advance to the giv
point, he may make more detailed investigations as he retur

When the advance to an Artillery position is in question,
is especially desirable that scouts should examine all t
ground in the neighborhood of the position, so as to be able
lead officers or batteries quickly to any part of it.

3. In reconnoitering a route, scouts must be especially care
to note landmarks, to turn frequently, and look at the coun
which they have passed, and to take such other measures as w
enable them surely to retrace their steps either by day
night. Practice in moving at night is particularly import
for scouts.

4. When sent to examine a place in which an enemy m
be concealed—for example, a wood, a defile, a village—sco
first examine its approaches, its edges, and, if possible,
exits; they endeavor to reach a position from which t

overlook it; ordinarily, one scout or one party should ob-
while another passes through the suspected place.
preceding the column by only a short distance, scouts
act with great promptness.

When the information at hand as to the location and
sition of the enemy is insufficient, scouts may be pushed
ard to secure this information, both by personal recon-
ance and by communicating with our own advanced troops.
ch cases they should fix in their minds the lay of the ground
the enemy's positions, noting such landmarks and making
sketches as will enable them to give a clear description of
situation. Similar information should at the same time
secured with regard to our own troops.

During an action, when observation of fire or of the
ain is difficult, parties of scouts may be sent to occupy
ions from which they can keep their commander con-
ally informed as to the efficacy of the fire and as to chang-
conditions in the field of action. Thus they should be able
erify the presence of the enemy in a certain locality and
rt his situation and dispositions with reference to certain
marks; to report the arrival of bodies of the enemy in a
n position or their departure therefrom; to report the
ions occupied by our own troops, the possibility of firing
them with safety, and special ways in which the guns
be of assistance to them; to report whether or not our
is properly adjusted, indicating such corrections as may
ecessary.

As a general principle, Field Artillery in position is safe-
ded by troops of the other arms; but when posted in ex-
d positions as, for example, on the flank of a line, it is
mbent upon the Artillery commander, as an additional
aution, to post scouts where they may, by suitable signals,
timely warning of the approach of hostile parties.

The information secured by a single scout is ordinarily
municated by a verbal report. In the case of a patrol,

however, it is often advisable for the patrol commander to s
concise written reports, giving important information as
secured. These reports should be supplemented by a sk
on which is indicated the important information secured.
route sketch should be on a scale of 3 inches to the mile.
panoramic sketch of the enemy's position should show an
distances in miles between important points. The point f
which the sketch was made should be clearly stated and sh
if practicable, be indicated on the route sketch.

Scouts acting as auxiliary observers during an action re
if possible, by wire; otherwise, by signals with flag, h
graph, or lantern.

In communicating with each other for the purpose of ind
ing a change in the direction of march, scouts employ the
nals prescribed in these regulations.

The whistle or the arm signal is used for attracting atte
To indicate danger, enemy in sight, both arms are r
vertically. The arms are raised and lowered energetic
several times if the danger is imminent.

1528. Additional details relating to the duties of scouts an
be found in paragraphs 1615 and 1646.

SECTION III.—TRAINING OF SCOUTS.

1529. For scout duty, alert, cool-headed, and intelligent
should be selected; they should be good horsemen and
good eyesight and good hearing.

Each scout should be provided with a good field glass, a
pass, a watch, a whistle, a pocket message and sketch bo
pencil and a combination flag kit.

1530. The training of a scout should have for its object:

1. To develop his powers of observation.

2. To teach him what to look for and how to recognize it.

3. To teach him how to report intelligently and concisely.

The scout's powers of observation and description are d
oped first of all by simple exercises. Thus he may be requ

k at a given section of terrain and describe what he sees

scout is made to appreciate the lay of the land as indi-
primarily by its drainage, and secondarily by other nat-
eatures, and by the works of man. A good eye for coun-
thus to be acquired; the scout learns to appreciate the
ıration of a terrain which may be only partially visible
ı, and thus to deduce the most favorable routes for tra-
ş it and the most probable positions for hostile occu-

scout must also be taught to distinguish troops of the
nt arms, to recognize their formations and to familiarize
f with their usual methods of action.
scout must be trained (*a*) to use field glasses; (*b*) to
ıaps; (*c*) to make reports, both verbal and written; (*d*)
te route sketches; (*e*) to make panoramic and position
es; (*f*) to signal; (*g*) to operate telephones.

Section IV.—Agents.

. Agents are employed to act as mediums of written or
mmunication between the commander and the elements
ıed. They keep the commander informed as to the loca-
the several elements and the best route for approach-
ım, guide the elements into new positions when neces-
nd transmit information between the commander and
of the other arms.
battalion and higher headquarters is provided with
ıt agents for linking the commander with the next
units of his command. For cases which may require a
number of individuals than are thus provided, the
nate commanders detail the necessary additional men.
ımple, commanders of combat trains detail men to act
ıts in keeping the appropriate higher commanders in-
as to the position of the combat train and for maintain-
munication between the higher commander and the com-
n. Likewise, when the commander of the Field Artillery

of a division or of a smaller force acting independently is with the commander of the troops, the former leaves his ad tant or an appropriate individual to represent him at the he quarters of the command. An important function of the a so left with the commander of the troops is to obtain and to h the Field Artillery commander advised of all information wh may assist or otherwise affect the Field Artillery.

1582. Agents are especially trained and exercised in carry verbal messages; in map reading, so that they may be to identify positions or roads pointed out to them on the m in simple sketching, so that they may be able to indicate r tive positions of troops, features of the terrain, etc.; in f ing their way, both by day and night, to designated di positions; in signaling; in the use of the service buzzer.

Certain details in connection with the performance of co duty by agents are noted below:

(*a*) A courier makes every effort to keep himself infor as to the location of the subdivision to which he pertains and to the route by which it may be most readily reached.

(*b*) When sent on a mission he notes carefully the cou traversed, the facilities and difficulties which it offers for passage of field artillery, and endeavors to impress u his mind the features of the terrain so that he would be to guide troops through it if called upon to do so.

In pursuing a given route for the first time, it is advis to turn frequently and observe how objects appear a they have been passed; retracing the same route is thus facilitated.

(*c*) He moves promptly when on an errand, and all nothing to delay or interrupt him. All military persons required to expedite the movements of such messengers to point out promptly the best routes for reaching the division or individual sought.

(*d*) On reaching his destination, if the individual sought not immediately seen or recognized, the courier calls out name or military designation of the person sought: e

ommanding officer, Battery A, First Field Artillery." It ot necessary for a mounted man carrying a message to ount when addressing or addressed by a dismounted ofcer.

e) Having delivered the message he waits in the presence he individual receiving it until notified whether or not an wer is to be taken. In case of delay he asks for instructions. nportant messages should always be in writing and should cknowledged by the receiver's initials on the envelope, with e and time of receipt.

erbal messages should always be repeated by the courier in presence of the sender before starting on the errand. The sage should be couched in concise terms. The sender should e sure that the courier grasps its spirit and meaning.

f a courier is aware of the nature of the message carried has noted any circumstances bearing upon its subject matsince leaving the sender, he should, after delivering the mese, report the circumstances.

f) If a courier, after diligent search, is unable to find the ividual to whom he is sent he endeavors to find some other son who can take full advantage of the information conred. Whether or not this can be done, he always reports k to the sender with full facts in the case.

t is the duty of all subordinate Artillery commanders to ify the next higher commander when circumstances require m to make a material change of position without the knowle of the latter.

g) A courier should note matters of military interest, espelly those affecting the subdivision to which he pertains, and uld make report of any essential matters on his return to officer to whom he is assigned.

If he carries an order directing a change of position of a subsion, it is often advisable to direct him to accompany the division into the new position so as to enable him to become miliar with the ground and to be able to report upon conditns in the new position.

SECTION V.—ROUTE MARKERS.

1533. It is incumbent upon an officer preceding his command for reconnoissance or other purposes to mark the route so that uncertainty may not arise on the part of those in rear as to the route to be followed.

The individuals employed on this duty are termed route markers. All enlisted men belonging to headquarters detachments and to battery details are trained in the performance of this duty.

The sergeant major of a battalion or regiment or the first sergeant of a battery is charged with the details of the service, thus leaving the commander to devote himself to the reconnoissance or other work.

Within a column it is the duty of each element to maintain touch with the element next preceding it.

1534. A marker is made to understand clearly:

(*a*) The route to be followed.

(*b*) The particular organization to be guided.

(*c*) The message, if any, to be delivered.

(*d*) The route he is to follow in order to rejoin the commanding officer.

The marker indicates the correct route, acting as guide if necessary over terrain where the route is difficult to follow, and as soon as his mission is fulfilled hastens to replace the next marker or to rejoin his detachment or detail. If necessary, mounted men may be temporarily taken from the organizations of the command to increase the number of markers. The number employed, however, should always be the minimum consistent with insuring the uninterrupted march of the command.

By the establishment of well-understood conventions, or by the use of suitable signs, the number of markers may be reduced. Thus, it should be understood that a main traveled road is not, without indication, to be left for one that is notably less traveled, and that a straight road is not, without in-

ion, to be left for one which deviates from it. By marking ows on trees and buildings, or by other suitable signs, un- tainties of a minor nature may be removed. In important es, however, a marker should always be left at places where easonable doubt may arise.

Vhen the head of the column for which the route is being rked comes within view of a marker the latter signals the mer, and the former acknowledges with a countersignal. th signal and countersignal should be distinctive and should ve been previously agreed upon. The same signal and intersignal are used throughout the detail.

APTER III.—LOCATION IN THE COLUMN OF MARCH, SECURITY AND SUBDIVISION FOR ACTION.

1535. Artillery is usually placed in the column of march so at its early entrance into action is facilitated and its security sured by the other arms. These two considerations are fre- ently antagonistic, therefore in any situation both should be nsidered but the more predominant should have precedence.

In an advance, its entry into action is generally facilitated its deployment or its maneuvering area to position is in the rection of the enemy rather than to the rear; in a retreat, its deployment is away from the enemy.

In an advance the Artillery of the main body is generally well rward in the column, while the Artillery of the advance guard well to the rear of that formation, generally with its reserve. nder certain circumstances of an advance, as when the hostile sistance takes the form of annoyance by small bodies and in a rsuit, a part or all of the Artillery of the advance guard may further forward in that formation.

Under special conditions such as a night advance, or opera- ons to the front in terrain where Field Artillery would have chance to deploy or to fire, or operations that must be begun clusively by troops of the other arms the Artillery may be aced in the rear of the combatant column.

1536. In a retreat, any Field Artillery not assigned to the rear guard should generally march near the tail of the main body, while that assigned to the rear guard is placed in column according to the requirements of the special situation.

1537. The position of the Artillery in column in flank guard is dependent on the foregoing principles of expedition of entry into action and of security, and upon the special tactical situation, in which the probable direction of hostile opposition is the dominant feature.

1538. The position in the march column of Horse Artillery operating with Cavalry is governed by the foregoing principles. Wherever placed in the column it is important that it march united.

1539. In close country or under special conditions, security may require the interpolation of troops of the other arms between the Artillery regimental or battalion units.

1540. While the general security is provided on the march as in combat, by the other arms this fact does not justify the neglect by Artillery commanders of necessary measures for immediate security.

1541. In order that he may obtain early information, the commander of the Artillery of each separate column usually accompanies the commander of the troops on the march. Similarly, the commander of an Artillery unit assigned to the advance or rear guard accompanies the advance of rear guard commander.

1542. Before occupying a position for action the batteries of a Field Artillery command are habitually subdivided as explained in paragraph **577**.

The place and time for subdivision are determined by the circumstances of the case. From a purely Field Artillery point of view it is desirable that the subdivision should not take place too soon, as the interposition of other troops might then render it difficult for the combat trains to remain in effective touch with their firing batteries. On the other hand when action is imminent, the commander of the troops will frequently order the

ıbat trains detached and assign them to a march position ırated from their firing batteries so as to expedite the entry ı action of a part of the Infantry.

he supply companies are habitually consolidated with the ply companies of the other arms.

543. When the combat trains are not detached and combat h the enemy is possible, they are assembled and marched in r of their battalions. Agents are sent to the battalion com-ıder. In this case the combat trains are required to fall out the column when a suitable place near the position to be ıpied is reached.

544. When the combat trains are detached they are habit-ly assembled by battalions. Each group of battalion combat ins thus formed is commanded by the senior present there-h. The various groups assemble in the march column in the ıe order in which the battalions to which they pertain are anged in the column of march. When desirable each regi-ıtal or brigade commander assigns an officer to command all groups belonging to his unit. The functions of this officer h respect to any battalion unit cease at the moment its talion commander sends orders as to the position to be taken his group. The assignment of senior officers to command the ıbat train groups during the march will frequently facilitate movements of the combat trains.

545. Whenever the combat trains are assembled by battalion ups, careful arrangements must be made to assure the main-ance of communication to include that between the firing teries and their combat trains. Each consolidated battalion ıbat train sends an officer to accompany its battalion com-nder and to act as agent between the latter and his group of ıbat trains. This agent is habitually accompanied by an lerly and by the chief mechanic of each of the batteries of ıt battalion. Whenever necessary, additional mounted men detailed from the combat trains to accompany the officer who s as agent.

CHAPTER IV.—CHOICE OF POSITION.

SECTION I.—THE FIRING BATTERIES.

1546. The area within which the Field Artillery must t position is determined by the tactical situation and the p of action decided upon by the commander of the troops. T Field Artillery is not free, therefore, to choose its own p tion, but must make the best use of the terrain within the l its thus imposed.

1547. The commander of the troops designates the areas places near which the Field Artillery is to take up its positi and influences the distribution of the units by a general i cation of the tasks to be performed.

The Artillery commander distributes the areas to be oc pied among the regiments or battalions of his command assigns duties to those units.

In many cases it may be practicable to embody the assi ments, etc., made by the senior Artillery commander in order given by the commander of the troops.

Regimental commanders amplify the orders of the senior tillery commander as may be necessary, particularly with re ence to ammunition and other supply and the lines of comm cation.

Battalion commanders assign their batteries to position areas in which to take position, and assign targets or sectors attack or observation.

Since the proposed plan of action influences the choice of p tion, it is important that all of the above commanders tran to their subordinates all available information as to the p of action and the part to be taken by their respective units.

1548. The only invariable rule in the choice of a positio so to post the guns as to be able to carry out effectively the assigned them.

Important considerations in the choice of a position are:

1. Obtaining an effective range.
2. Securing a large field of fire.

Concealment from view.
Facility of movement to the front, flanks, and rear.
Proximity of good cover for teams.
Favorable conditions for resupply of ammunition.
itions combining all of the above qualifications are sel-
or never found. The choice as to which consideration
s most weight depends upon the tactical situation.

49. By a suitable choice of positions and of observing sta-
the greater part of the terrain within range of the guns
be included within the field of fire. Concealed positions
indirect laying are habitually used. Certain conditions
re positions in the open from which direct laying may
ed.

50. The existence of dead spaces may be obviated and the
of fire enlarged by the skillful disposition of the units of
ld Artillery command.
an intelligent dispersion of units the effect of the enemy's
s diminished and his difficulties in adjustment increased.
organization of the services of information and communi-
n may secure concentration of effort even though the
be widely separated. Such separation, however, increases
lifficulties of command.

51. When not incompatible with the effectual accomplish-
of the duty to be performed, concealment from view is
ys to be sought. This is true whether direct or indirect
g is employed. By rendering the guns inconspicuous or
ely concealing them their sustained service may be counted
, while the difficulties of the enemy in locating his targets
adjusting his fire are increased.

52. Skill in the concealment of guns is to be acquired by
ul study of ground and by extensive experience on a
d terrain. The following suggestions are to be noted:
sitions which, from the enemy's point of view, are on the
line are usually the most conspicuous. By placing the
below the sky line, so that they will have a favorable
ground and by preventing movements of the personnel, a

battery may be unrecognized, even though it is in the op
It is important, however, to have a crest, a hedge, or a cl
of trees in front so as to increase the enemy's difficulty
observation and of exact location. In the absence of nat
cover artificial means may be used to conceal the guns.

A position in rear of a crest, with a parallel crest of ab
the same height in front and some distance away, offers m
advantages. The enemy is apt to mistake the crest nearest h
for the one actually occupied and to consider shots fall
between the crests as beyond his target. Trees, a hedge, stan
ing grain, etc., 400 or 500 yards in front of the guns, and
that the line of sight just passes over them, may similarly ser
to deceive the enemy as to the actual position.

When indirect laying is to be employed, a position on a ge
slope just far enough behind the crest to insure the conc
ment of the flashes best facilitates running the guns up to t
crest should direct laying be called for. If the position is
covered by the enemy, however, and the crest is plainly seen
him, the guns are in a very vulnerable position, as shrapnel m
be employed to search such a reverse slope very effectively.

The most advantageous position, from the point of view
concealment alone, is one more than 400 yards in rear of
covering mask, having flash defilade and hidden from the vi
of any auxiliary observers whom the enemy may push to t
front and flanks.

A position on the counter slope is frequently advantageous
reducing dead spaces, facilitating ammunition supply, and sec
ing suitable observation stations near the guns.

1553. Ruses.—Dummy emplacements suitably prepared
often serve to deceive the enemy, distract his attention, a
cause him to waste ammunition.

A few guns may be sent to occupy detached positions, with
view of drawing the enemy's fire and leading him to disclose
position and strength. Such guns should be posted with w
intervals; their rapidity of fire may be utilized to produce
impression of a large force of artillery.

554. Firing over friendly troops.—Firing over our own ops is to be regarded as a normal procedure.

reedom is thus gained to post artillery so as to cover ctively the whole front of the combat and to realize the er of concentrating the fire of widely separated lines.

rojectiles should clear friendly troops by at least 10 yards. e over them should not be conducted with elevations of less n 1,000 yards, or when they are within 400 yards of the s. These limitations are modified by the relation between itions occupied by the target, the friendly troops, and the s.

TION II.—LIMBERS, COMBAT TRAINS, AND AMMUNITION TRAIN.

555. The preservation of the ability to move Artillery deds upon the protection of the teams from hostile fire.

556. The limbers.—The position to be occupied and the mation to be taken by the limbers depend upon the nature of cover available. To secure the maximum protection and to e free and prompt access to the guns are the objects in view the choice of position for the limbers.

Concealment from view and protection from fire as well are ured by placing the limbers behind vertical cover. When h cover is available the limbers are ordinarily placed in tion or double section column parallel to the cover.

Ridges having easy slopes afford concealment from view. ey do not, however, afford protection from searching fire. e effect of searching fire in such cases may be avoided or atly reduced in amount by placing the limbers more than 400 ds in rear of the covering crest.

If the limbers can not be echeloned with respect to the firing iteries, they should be at least 500 yards in rear of the guns. When it is impracticable to conceal the limbers from the view the enemy, they should be posted as far from the guns as conditions of the case warrant, and formed in line, faced ward the enemy, with as wide intervals between carriages as ground will permit.

1557. The combat trains.—In action the battery combat trains are usually united and are posted as a battalion group. For position for the group the first considerations are protection from the fire of the enemy and covered approaches to the firing positions of all the batteries. Other considerations are: Ample space to permit parking the carriages with considerable intervals; ease of access to roads running back toward the position of the distributing station established by the ammunition trains; facilities for visual communication with the battalion and battery commanders' stations.

While it is desirable that the greatest distance between the group of combat trains and any firing battery position be not over 1,000 yards, this may be somewhat increased when ample cover is not available.

1558. Artillery ammunition train.—This train is usually directed by the commander of the troops to proceed to some central point from which roads radiate to the position, and there place itself at the disposal of the Artillery commander. The place selected depends upon tactical considerations, the terrain and communications. Its first position is usually 2 or 3 miles in rear of the firing batteries. The operations of the Artillery ammunition train after arrival at this point are controlled by the Artillery commander. The train makes all of its positions to secure prompt resupply of the batteries in ammunition, men, matériel, and horses.

CHAPTER V.—DEFILADE AND COVER.

1559. The best protection from hostile fire is concealment.

1560. The principal means of concealment is the defilade of the guns from all points within the enemy's position. Complete concealment requires the flashes of the guns to be not visible from the enemy's position. Such concealment requires in daylight a defilade of about 4 yards.

1561. In the selection of a position it is necessary to determine the defilade which can be secured while keeping

ajectory, at the shortest range to be used, above the mask ording the concealment.

1562. When direct laying is to be used the necessity for ing the target through the sights fixes the position to one ry near the line from the mask to the target. Similarly, ble concealment is possible when very short ranges must be ed.

1563. When time and instruments are available a position of e guns for indirect laying may be accurately determined so to obtain the greatest defilade consistent with the terrain d the range to be used.

Very frequently, however, the approximate position of the ns or, conversely, whether or not the trajectory will clear e mask when certain ranges are used must be determined ring a rapid reconnaissance and when instruments are not ailable.

1564. Training may enable officers to make approximate lutions of the problem by simple estimation (1175). Simple ethods based on approximate measures may give still more curate results.

Such methods are dependent upon the angles of elevation rresponding to the various ranges. For the 3-inch guns ese angles may readily be remembered. For 1,000 yards the rresponding elevation is approximately 20 mils; 2,000 yards quires 50 mils elevation; 3,000, 90; and so on the difference elevation corresponding to successive ranges increasing arithmetical progression.

1565. When the position considered is on the reverse slope e possible positions in which the guns may be placed may be termined as follows: The observer, mounted, places himself that the target or terrain on which the target is expected just visible over the covering crest. If the distance of the server to the crest is 60 yards or over the guns may be aced anywhere on the reverse slope so long as this slope mains approximately regular and yet be able to clear the est at ranges of 2,000 yards and over.

This method rests on the assumption that the height of the eye of a man mounted is about 3 yards above the ground. Since the observer mounted is so placed that the line from his eye to the target is tangent to the crest, the slope, when he is 60 yards from the crest, is 1 on 20. A slope of 1 on 20 is equivalent to an angle of 50 mils, which corresponds to a range of 2,000 yards.

If the distance of a dismounted observer is 40 yards from the crest when the target is just visible above the mask, the guns may be placed somewhat down the slope from the observer and yet be able to fire at a range as short as 2,000 yards. The reasons for this are similar to those outlined in the preceding paragraph.

1566. Similar methods to those above described enable a reconnoissance officer to approximate the least range corresponding to a position on any reverse slope. The height, about 1 yard, of the axis of the bore above the ground as well as the errors in the assumptions tend toward certainty of the trajectory clearing the crest. When friendly troops occupy the covering crest or when the position of the guns is several hundred yards from the mask, allowance for safety may readily be made.

Thus, if the reverse slope is 1 on 20 and it is desired that the trajectory pass 10 miles above the covering crest, the guns may be placed practically anywhere on the slope and yet clear the crest at a least range of about 2,300.

1567. When mountains are visible in the direction of the targets or when certain cloud conditions exist with sufficient stability, it is sometimes possible to locate a point at a height above the target equal, or nearly so, to the elevation corresponding to the range. When this is possible the position of the gun giving the maximum defilade may readily be determined as follows: From the covering crest select the nearest target, or point on which fire is to be delivered. With the hand lay off above the target the corresponding elevation and locate the resulting point. Moving down the reverse slope the guns can be placed

here so long as this auxiliary point is visible. For ex-
e, from the covering crest the observer locates the nearest
t and estimates its range as 2,000 for which the elevation is
ls. Laying off a vertical angle of 50 mils from the target
cates a certain natural feature. He then goes down the
se slope until this feature is just visible above the covering
This position is that giving the maximum possible defi-
If the resulting position is several hundred yards away
the crest allowance must be made for the drop of the
ctory from the line of departure. Ten mils, for example,
readily be allowed by determining the position from which
ocated point will appear at that angle above the covering

68. In rolling country practically any position on the
erslope may be occupied. In more broken country the
wing method may be of assistance: Locate the point on the
terslope from which the nearest target upon which fire is
delivered is just visible above the covering crest. Esti-
the range to the target and to the covering crest. Deter-
the elevation corresponding to the range from the covering
to the target. Consider each unit of the number of hun-
s of yards to the crest as one-tenth and multiply the result-
decimal by the elevation just determined. Considering the
uct obtained as yards and going down the slope toward the
ring crest the guns may be placed in any position so long as
vertical distance in yards below the point on the counter-
from which the target could be seen is less than the
uct mentioned.

r example, standing at the point on the counterslope from
h the nearest target is just visible above the covering crest
range to the target is estimated as 2,500 and the distance to
overing crest as 500. The difference, or the range from the
ring crest to the target, is 2,000 and the elevation corre-
ding to 2,000 is 50. Multiplying 0.5 by 50 we obtain 25.
guns may be placed 25 yards vertically below the observer.

This method makes ample provision for certainty in cle the covering crest.

1569. When the terrain to be occupied is flat and the is afforded by trees, buildings, etc., the least range for any tion may be found by measuring the angular height of the from the position. The range corresponding to an ele equal to the resulting angle is the least range. Convers position from which a given least range may be used m found by taking the corresponding elevation and deter the point from which the angular height of the mask is to the elevation. To provide for certainty of clearing the the range considered should be that from the mask t target.

1570. When the position is on a reverse slope the guns be moved nearer the crest as the least range is reduced there are two positions on most practicable reverse slope fairly near the crest and the other at a considerable di from it, corresponding to a given least range the for statement is not strictly exact, but as the position at a co able distance from the crest requires accurate determin the rule is applicable to practical use.

When the position is on a counterslope or on flat terra guns must be moved away from the crest or mask as the range is reduced.

1571. Positions which are seen against the sky fro enemy's line are particularly visible. Similarly any p which tends to give matériel or personnel a clear definit seen from the enemy's position increases the exposure.

Positions in the shadow of trees, against a neutral ground, in weeds, brush, or growing crops greatly decrea visibility.

The outlines of matériel may be broken by tying bra etc., to the caissons, wheels, and other parts.

The dust raised by the discharge of the pieces may b duced by wetting the ground or by covering it with wet s branches, or other noninflammable material.

72. Protection from observation by aircraft is obtained by
ng the guns under trees, by placing brush or small trees
nd the guns, by providing an overhead screen of the same
as the surrounding terrain, and by any means of breaking
outlines of the matériel. Complete immobility on the part
ll the personnel during the time that hostile aircraft are
servation is also an important means of avoiding notice.
73. While concealment from view is of great importance,
rial cover must never be neglected. Especially when large
s are engaged, the lulls in the action provide ample time
h can be utilized in the preparation of artificial cover.
74. As soon as possible after the occupation of a position
executive, under such instructions as the captain may give,
ns intrenching by filling in the space between the aprons
the ground and by providing protective cover, preferably
sand bags, between the adjoining wheels of the pieces and
r caissons.
he preparation of this cover is secondary only to the actual
g and the supply of ammunition. It is habitual and is
ied out by the executive except on the express order given
the captain at the time of occupying a particular position.
rain sacks or other material suitable for sand bags will be
ied on the carriages in campaign.
575. The first cover provided should be constructed with a
v of its being developed into complete protection as the
pation of the position continues.
576. The plan to be followed depends upon the terrain.
ce positions are habitually concealed, parapets may
ally be constructed. Such construction is usually independ-
of the nature of the soil; it has the advantage of not dis-
bing the surface of the ground on which the matériel rests.
surface frequently makes a better gun platform than the
soil.
uitable protection obtained through the use of parapets is
wn in the following diagram. The earth for the parapet
y be obtained in part as indicated or all of the earth may

be taken from the front, leaving the ground immediately rear of the carriages undisturbed.

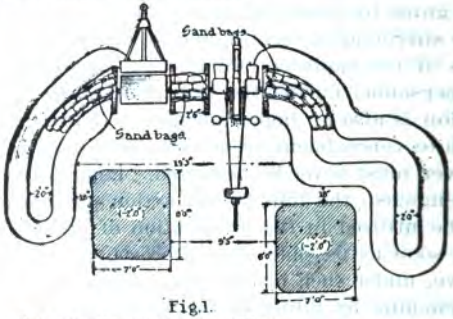

Fig.1.

Hasty entrenchment for field artillery.
Protection against rifle fire and shrapnel.

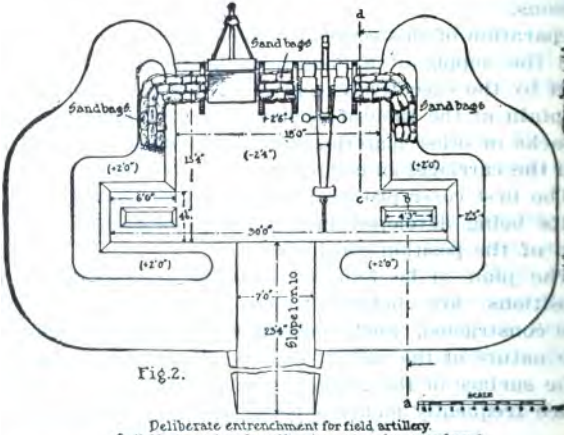

Fig.2.

Deliberate entrenchment for field artillery.
Suitable type when depression is necessary for concealment.

1577. When the position is on flat terrain which is visible to the enemy, gun pits may become desirable to increase concealment. The diagrams below show a suitable type of

578. Cover for the executive and the telephone operator at battery may be obtained by the use of one of the fifth sec- caissons, by constructing parapets, by digging a pit, or by ombination of these methods.

579. Since observation stations must be so placed that the ny's position is clearly visible, special measures must be en to secure concealment and protection.

articular care must be taken to avoid movements which ht be visible to the enemy in the vicinity of the station. instruments must be so placed as to secure the maximum ealment consistent with efficient observation.

is usually necessary to construct both artificial conceal- nt and protection.

580. The protection which can be afforded to the material ecessarily limited by considerations affecting the ease of serv- of the pieces. When the position is to be occupied for a con- rable length of time it is essential to provide cover, in which personnel may be secure during lulls in the firing and during periods in which the men must rest.

etails of the construction of such cover are so dependent n the terrain, the situation, and the available material that r the most general rules can be prescribed.

eparate cover for each gun squad should be provided in the ediate vicinity of the pieces. Overhead cover against apnel and shell fire from the smaller calibers is essential. rhead protection against the heavier shells is seldom prac- ble. Two to three feet of earth is, therefore, the usual ount of overhead cover provided. Drainage and other sani- y arrangements are of the greatest importance. The floor ce in the cover provided for each gun squad should not be h less than 7 by 30 feet. Separate cover is provided for the cutive, his assistant and telephone operator, and for the ial details.

581. In positions which are occupied for several days special e must be taken to improvise facilities for proper cooking by

the organization cooks. Cooking places must be under cover
places so located that meals may readily be carried to all pa
of the position.

Even though field ranges can not be brought up the utilizat
of such material as can be had in any inhabited country sho
make it practicable to avoid the disadvantages of individ
cooking.

CHAPTER VI.—RECONNOISSANCE AND SELECTION O
POSITIONS.

SECTION I.—GENERAL PRINCIPLES AND DUTIES.

1582. The duty of locating the enemy and of securing in
mation concerning him devolves in general upon troops of
other arms. It is most essential that the information
secured should be promptly transmitted to the Artillery.
successful cooperative action depends in great measure
the maintenance of quick and reliable communication betw
the different elements of a command, artillery command
should use every means in their power to establish such re
tions with commanders of the other arms as will insure pro
transmission of information.

1583. The Artillery must, however, obtain for itself
special information as is needed to insure the proper pos
and the effective employment of the guns to carry out the t
assigned it. For this purpose reconnoissances are made
the artillery commander and his immediate subordinates,
sisted by their respective reconnoissance officers and scouts.

The effective action of Artillery is enhanced by (*a*) se
ing at once the most favorable positions; (*b*) making the ne
sary preliminary dispositions, such as securing firing d
organizing a suitable information and communication servi
(*c*) preparing concealment and protective cover; (*d*) posi
the guns without the knowledge of the enemy; and (*e*) o
ing at the proper time a sudden, unexpected, and overpowe
fire upon the designated objectives.

When it is necessary to bring guns into action quickly for support of other troops, the main consideration is to get in as promptly as possible to a place from which they can der effective support. In such a case, delay occasioned by search for technical and tactical advantages is entirely missible. A good eye for ground and skill in making use of ilable cover may, however, even here permit an artillery mander to post his guns advantageously.

s a rule, though, the necessity for the employment of illery may be foreseen and opportunity may be gained for ely preparation.

584. All Field Artillery commanders habitually precede their mands to the position to be occupied. Every effort should made to conclude all preliminary arrangements for action or to the arrival of the firing batteries. Delay in opening must not be caused by lack of timely reconnoissance and paration.

585. It is essential that the officer commanding the Artillery uld be in close touch with the officer commanding the ops. The Artillery commander should accompany the com- nder of the troops on the preliminary reconnoissance; should kept constantly informed as to the tactical situation and plan of action, and should receive early instructions as to special tasks to be performed by the Artillery. Similarly, ordinate artillery commanders should be kept informed of general plan of action and of the situation, so far as it cts them.

t the earliest opportunity the officer commanding the Artil- reconnoiters and selects the positions for the Artillery in ordance with the instructions which he has received and tactical requirements of the situation. He causes his im- diate subordinate commanders to accompany him or informs m when and where they are to report to receive their in- ctions and undertake their own reconnoissance. It is portant that they should reach the ground at the earliest cticable moment.

1586. When a commander rides forward on reconnoissance instructs the officer left in command on the following poin so far as may be desirable and practicable: (1) The tacti situation; (2) whether or not the command is to follow once; (3) the time and place for subdivision, if such s division has not been made; (4) the route to be followe (5) the rate of march. Additional instructions may be tra mitted from time to time by markers, who should be left places where uncertainty as to the route may arise or wh difficulties are to be avoided. As soon as the position and best method of approaching it have been determined u agents or scouts may be sent to meet battalions or batte and guide them by the most favorable routes to their respec positions.

1587. In undertaking a reconnoissance an Artillery, c mander should have a clear idea in his mind of the gen plan of action and of the task to be accomplished by the f under his command. Unembarrassed by details, he should st the tactical situation and the lay of the ground, select the p tion with a view of carrying out his special mission, a arrange for the necessary preparatory dispositions. The de of securing information, etc., should be performed by recon sance officers and scouts.

1588. It is advisable to attach Artillery reconnoissance offic to advanced troops in order that they may secure early inf mation as to the enemy, and give the Artillery command detailed information as to the ground available for occupat by the Artillery and as to the location and disposition of enemy and of friendly troops. To insure effective cooperat officers generally accompany the commanders of the Infa lines during either offensive or defensive action, in order keep the Artillery commander informed as to changes in tactical situation and as to the cooperation desired of Artillery by the Infantry.

Reconnoissance officers of the smaller Artillery units may attached to the senior Artillery commander, when actio

inent, in order that they may commence, before the arrival
heir own immediate commander, the detailed reconnois-
e of the position selected for the particular unit concerned.
econnoissance officer operating in this manner, as well as
who arrives with his immediate commander, examines the
hborhood of the position, locates his own troops and those
he enemy, prepares firing data, and, in general, secures the
ssary information for his commanding officer and relieves
latter of details.

attery reconnoissance officers are habitually under the im-
liate orders of the battalion commander on marches in the
ence of the enemy.

couts may be employed to assist reconnoissance officers and
plement the information secured by them.

589. An Artillery reconnoissance officer attached to ad-
ced troops should, as soon as possible after the determina-
n of the enemy's location, submit to the Artillery commander
eport giving all obtainable information as to the enemy and
cribing the most suitable position for our own Artillery.
is report should be accompanied by a sketch, showing the
my's position, the position selected for our own Artillery,
characteristics of the country intervening between the two,
l such other important information as may be readily set
th. The report should embrace information such as the fol-
ing relative to the position selected: (*a*) The various routes
approach and their relative practicability, stating difficulties,
any; (*b*) possibility of approach under cover; (*c*) whether
ect or indirect laying is recommended; (*d*) cover afforded
guns; (*e*) need of providing artificial cover; (*f*) number
batteries which may be posted advantageously in the posi-
n; (*g*) facilities for protecting the limbers, horses, etc.; (*h*)
ility for resupply of ammunition; (*i*) in case indirect laying
recommended, possibility of securing good aiming points and
d observing stations and of firing over intervening obstacles.
As to the enemy, the report should include information as to:
) The most important and immediate targets; (*b*) location

and strength of the various hostile bodies; (*c*) location of probable location of the hostile Artillery.

1590. Whether in a position thus tentatively selected or in one chosen by an Artillery commander, a reconnoissance officer is required in appropriate cases to prepare a sketch of the enemy's position. The known positions of the enemy, the prominent features of the landscape as well, are named or numbered on the sketch; copies of such a sketch being sent to the subordinate Artillery commanders, the indication of objectives may be facilitated. Firing data are also secured by the reconnoissance officer and those pertaining to each important position shown in the sketch are indicated above it in the margin. When individuals using such a sketch for identification of positions are widely separated, allowance must be made for difference in point of view; moreover, in such cases any firing data appearing on the sketch should be carefully marked showing for what position it is appropriate. The position from which it was made should always be plainly described on the sketch.

1591. Scouts may be employed to assist reconnoissance officers and supplement the information secured by them.

1592. Reconnoissance and other duties in the occupation of position pertaining to various individuals in a force comprising several battalions of Artillery are indicated below; the summary thus given, however, is to be regarded merely as a general guide, and not as specifying all the duties to be performed.

Artillery Commander.

(*a*) Informs himself as to the enemy's location and dispositions and the general plan of the commander of the troops.

(*b*) Examines the terrain.

(*c*) Submits to the commander of the troops recommendations as to the use of and positions for the Artillery.

(*d*) Assigns the regiments, and, if necessary, smaller units, duties and to areas to be occupied in accordance with the plan decided upon by the commander of the troops.

e) Takes general measures to insure communication between Field Artillery and the other arms, as well as between the ients of the Artillery itself.

) Takes general measures for the security of the Field Ar- ry in combat and its resupply.

r) Takes definite measures to insure communication between self and the commander of the troops.

Regimental Commander.

t) Informs himself as to the enemy's location and disposi- s and as to the location and dispositions of friendly troops.

) Examines the area assigned his regiment by means of a nnoissance which should be as thorough as the situation nits.

e) Assigns the battalions to areas or positions and duties n as much exactness as the conditions permit.

l) Takes definite measures to insure communication be- en his headquarters and the trooops which his regiment is ipport, as well as between his headquarters and the stations his battalion commanders.

e) Supplements the arrangements for the security of his ment and for the supply of ammunition in accordance with instructions which he has received.

Battalion Commander.

t) Secures by personal observation and by the employment econnoissance officers and scouts information as detailed as ible as to the location and dispositions of the enemy; the tion and dispositions of friendly troops; the terrain in and it his assigned position or area—the best methods of ap- ching it advantageously, its freedom from the enemy, etc.

) Examines the general position assigned him.

e) Assigns the batteries to duties and to positions, indicating location of their observation stations when such action is ticable and desirable.

(*d*) Gives such instructions concerning protective cover as may be necessary.

(*e*) Provides for such auxiliary observing stations as may be needed to secure information as to the effectiveness of our own fire and as to the movements of the enemy and of friendly troops.

(*f*) Provides for communication with battery commander and with his auxiliary observers.

(*g*) Makes sure that the security of the position is provided for by adjacent troops or by scouts.

(*h*) Selects practicable routes for subsequent possible movements to the front, flanks, or rear.

(*i*) Provides for the resupply of ammunition, selecting a position for the combat train in case the battery combat trains are united.

Battery Commander.

(*a*) Examines the targets or sector assigned him and studies carefully the ground in its neighborhood.

(*b*) Examines the ground assigned him for a position and picks out the most suitable place within the limits imposed for posting the firing battery.

If direct laying is to be employed, he makes sure that each gunner will be able to see through the sights the part of the target to be assigned to him.

If indirect laying is to be employed, he makes sure that each gun will be able to fire over any intervening obstacle, and selects an aiming point, verifying the fact that each gunner will be able to see it through the sight.

(*c*) Selects a suitable observing station within the limits imposed by his orders and the situation.

(*d*) Determines the best method of approaching the position under cover if possible.

(*e*) Selects the place for posting his limbers.

) Selects position for his combat train whenever the bat- combat trains are posted separately.

) Sends instructions to the executive for posting the ery.

) Secures such firing data as may be needed.

The Reconnaissance Officer.

reconnaissance officer is, in general, charged with:

) Securing by personal reconnoissance and the assistance couts such information as to the enemy, our own troops, he terrain as is desirable or ordered.

) Supervising the work of scouts, observing parties, etc.

) Securing and tabulating firing data, preparing sketches, securing other information requisite for the direction and uct of fire.

) Observing the field of action, watching for movements he enemy and of our own troops which may affect the ation, and keeping his commanding officer apprised of nges in the situation.

The Executive Officer.

) Commands the battery in the absence of the captain.

) Conducts the battery to the position selected by the ain.

) Posts the firing battery.

) Makes all preparations necessary to expedite the open- of fire.

) Takes his station near the guns where he can best exer- his functions.

) Verifies the reliability of the communication systems at station.

) Forms the sheaf as soon as the necessary data are lable.

) Attends to the preparation of protective cover and to immediate security of the firing battery.

SECTION II.—USE OF THE SPECIAL DETAILS IN THE RECONNAISSANCE AND OCCUPATION OF A POSITION.

1593. The method of using the special details in the reconnaissance, selection, and occupation of a position must be sufficiently flexible to be adapted to varied conditions and circumstances. For training the detail a carefully planned system must be followed to accomplish satisfactory results. Such a system is outlined below. When it is used as a basis of training, simulated casualties among personnel and mounts and injuries to matériel, suitable tactical situations and the choice of varying kinds of terrain may be depended upon to stimulate interest, to prevent blind reliance on a fixed scheme and to adapt the detail to meet emergencies.

1594. When work is to be by battalion the agent reports and remains with the battery commander until the battery is reported in order, when he is sent to report to the battalion commander.

1595. Three blasts of the whistle is the signal for the battalion officers, the first sergeant, and the special details equipped for reconnoissance to report to the battery commander. If necessary the chiefs of platoon and of section call out passing back the command, **Detail.** As the detail rides up it may conveniently form in the following order:

		0	Battery commander.
		0	Bugler.
		0	Instrument sergeant.
Scout No. 2	0	0	Range finder.
Telephone corporal	0	0	Scout No. 1.
Operator No. 1	0	0	Operator No. 2.
Horseholder	0	0	First sergeant.

It is reported to the captain by the instrument sergeant, for example, "Sir, the detail is present," or "Operator No. 1 (or such member) is absent, sir."

the captain or the instrument sergeant desires to verify detail he commands, **CALL OFF.** The detail calls off in r from left to right and from rear to front.

96. When the officers, first sergeant, and the detail have rted the captain gives instruction as follows:

The tactical situation.

Whether or not the command is to follow at once.

The time and place for subdivision, or that this informa- will be communicated later.

The route to be followed.

The rate of march.

97. The first sergeant is responsible that the route is ted. Should he be uncertain as to when this is to be done n any point in connection therewith, he asks the captain nformation.

98. To mark the route the first sergeant calls **Marker** at point where he desires one placed. Members of the detail ut and are posted in the same order in which they call off.

99. The route is marked by the relay method; that is, ator No. 1 relays from battery to operator No. 2; operator from operator No. 1 to telephone corporal and so on. An tion to this method is that any marker intrusted with al message to the rear, the necessity for which should be quent, remains in place until he has delivered it. A writ- essage may be transmitted from a marker to his relief.

00. If caisson corporals are available they can profitably ed as connecting files between the battery and the first er, operator No. 1. They then act as ground scouts by ing the best route for the battery to pass over and at the time make it possible for operator No. 1 to keep con- ably closer to the remainder of the detail.

01. The instrument sergeant is always responsible that the , when together, rides at a collected and orderly gait and at a suitable distance behind the captain.

02. On approaching a position the instrument sergeant ises particular care to keep under any available cover.

Ordinarily it will be possible for the detail to halt together in rear of a crest while the captain rides forward to make the reconnaissance. As a usual thing the captain will dismount before he becomes exposed. The orderly, who remains behind, watches the captain, and when the latter is about to dismount rides up to take his horse. In doing this he comes up on the right of the captain's horse and, without dismounting, takes the reins as they are passed to him. This puts the off side of the captain's horse next to the orderly and leaves the near side free for mounting.

1603. If the captain, in making his reconnaissance, disappears over the covering crest, he is followed and kept in view by the instrument sergeant. If the latter also disappears, he is followed by the range finder, who in turn is followed by scout No. 2, and so on, each man being careful to keep in view the man next ahead. These connecting files remain mounted if the captain remains mounted; they dismount if he dismounts.

1604. When the battery commander calls **Detail** or signals by three blasts of the whistle, the instrument sergeant, scout No. 2 and range finder dismount. Scout No. 2 passes the reins of his horse to the horseholder, who rides up on his left. The range finder links his horse to scout No. 2's horse. The instrument sergeant links his horse to the range finder's horse.

The linked horses having been turned over to the horseholder, these three men approach the battery commander at intervals such that to hostile observation they will present the appearance of infantry rather than that of a battery staff. The battery commander then states so as to be heard by all three:

1. Any later or additional information regarding the situation.

2. The limits of the sector with the location of the enemy and friendly troops.

3. The reference point or points.

The target, if known.
The approximate location of the battery commander's
on.
The approximate position of the guns.
The aiming point.
Kind of communication.
Any necessary instructions relative to artificial cover for
attery commander's station.

the battery commander fails to give any necessary infor-
on, it is asked for. If the range finder and scout No. 2
ot yet up, they secure all necessary information from the
ument sergeant upon their arrival at the station.

)5. The captain may then proceed, mounted or dismounted,
connoiter the gun position. In the meantime the instru-
sergeant and the range finder set up their instruments,
g the maximum degree of cover which the position affords,
secure the data for the target or targets or for promi-
points within the sector. Scout No. 2 from a well-concealed
observes the target, looks for other targets within the sec-
and, unless otherwise employed, makes a sketch of the
r.

time is available, the instrument sergeant and the range
assist scout No. 2 in plotting prominent points of the
and in recording firing data therefor.

)6. In open country it will often be practicable to describe
dicate satisfactorily the position for the guns without
ng it. In broken or close country or when the station
he gun position are widely separated or when the position
gely influenced by the covering crest, it will usually be
sary for the captain, either before or after the estab-
ent of his station, to visit and establish the gun position.
time will be available, and it will be advantageous,
gh not positively necessary, for him to visit the gun
on.

1607. If the captain visits the gun position the remainder of the detail, keeping under cover, follow him in the following order:

0 Battery commander.
0 Bugler.
Operator No. 1 0 0 Scout No. 1.
First sergeant 0 0 Operator No. 2.
Horseholder with led horses 0 0 Telephone corporal.

If the captain calls out Gun markers, operator No. 1 and scout No. 1 dismount, turning over their horses to operator No. 2, who rides upon the right of scout No. 1.

The telephone corporal, if not already informed, at once asks what kind of communication to establish.

The battery commander marks either the right or left flank with scout No. 1 or operator No. 1 and places the other man on the line. To aid the executive the man who marks the left flank of the battery faces in the direction of fire with one arm extended in the direction of fire and one in the direction of the line of guns. If only a single marker is used he is posted as flank marker.

If not already known to them, scout No. 1 and operator No. 1 will ask as to:

1. The aiming point.
2. The direction of fire.
3. Kind of communication.

1608. If necessary or desirable the captain, accompanied by the orderly and the first sergeant, rides to reconnoiter a position for the limbers, and, in case the battery combat train is posted separately, a position also for the latter. One or both of these positions may frequently be selected prior to the selection of the battery station and marked by one or more members of the detail. All positions being chosen, the captain informs the first sergeant as to:

1. Position for the combat train, whenever the battery combat train is posted separately.

. Gait for the battery in approaching the position.
. Any necessary instructions relative to the formation and nner in which the battery should approach and occupy the ition.
. The aiming point.
. The position for the limbers.

he first sergeant will ask for information covering any or of these points, if they have not been made clear to him. then reports to the executive with the above information l guides the battery to the position.

609. When the first sergeant has received his instructions captain rides to the vicinity of his station and turns over horse to the bugler, who goes to the position of the horses onging to the detail and takes charge of them.

610. In approaching the position, the executive, in the abce of instructions, understands that the position is ready for upancy if he sees that the gun markers are posted. If he s that they are not posted, he halts in a suitable place until y are, or until he receives instructions. In all cases he uld reach the position sufficiently in advance of the battery determine the best method of going into action.

611. When telephone or buzzer communication is used the ephone corporal sees that operator No. 2 runs out the wire beginning either at the battery commander's station or the ition of the battery, depending upon which is nearer to the ce where he left his horse. Ordinarily the wire is run out as to leave the reel with operator No. 1 at the position of battery. This permits the buzzer at the station to be plugged and gotten ready for operation and affords the executive lati- le in placing his instrument without interfering with the trument at the station. Wherever the free end of he wire y be, enough slack should be left to permit considerable vement of the operator. When the command Close station given, the wire is reeled up by the operator who has the reel. e telephone corporal carries the captain's megaphone, and erator No. 1 carries that of the executive.

1612. With obvious modifications one or more of the gun, combat, train, and limber positions may be selected before the battery station and designated to the entire detail before or during reconnoissance.

1613. It is to be remembered that the detail should work together as a team. Each man has his particular part to play, but must stand ready to assist or take the place of any man who falls out. Every member should therefore be fully trained in all the duties of the others. In order to perform these duties with intelligence, efficiency, and cooperation, each must be furnished certain information by the battery commander. To this end each member is trained to know what information is required by him for the proper performance of his duties and to ask for any part of it if, at the proper time, the same has not already been made clear to him.

1614. It is the duty of all members of the battery detail to call the attention of the captain, the executive, or other responsible individual to any obvious error in reconnaissance and occupation of position and in preparation and conduct of fire.

1615. Following is a summary of duties in the battery detail:

Instrument Sergeant.

1. In general charge of the instruments and equipment used by the detail.

2. Forms and commands the detail.

3. Keeps the detail under cover when approaching or in the vicinity of the position.

4. Asks the battery commander, if not already informed as to:

(*a*) The situation.

(*b*) The limits of the sector with the location of the enemy and friendly troops.

(*c*) The reference point or points.

(*d*) The target.

(*e*) The approximate location of the battery commander's station.

f) Any instructions relative to artificial cover for the sta-

g) The approximate position of the guns.

h) The aiming point.

i) Kind of communication.

. Sets up the telescope and the aiming circle, taking as much antage of cover as the location of the station affords.

. Computes the firing data.

. During firing, keeps or causes to be kept the firing record l renders assistance in observing the fire and in collecting, ording, and transmitting data.

Range Finder.

. Responsible for the condition and care of the range finding trument.

. Acts as route marker.

. Asks the captain or the instrument sergeant, if not already ormed, as to:

a) The situation.

b) The limits of the sector, with the location of the enemy l friendly troops.

c) The reference point or points.

d) The target.

e) The aiming point.

f) Any necessary instructions regarding artificial cover for station or instrument.

. Finds the ranges required by the instrument sergeant and ut No. 2.

Scout No. 2.

. Acts as route marker.

. Asks the captain or instrument sergeant, if not already in-med, as to:

a) The situation or problem.

b) The sector, with the location of the enemy and friendly ops.

(*c*) The target.

3. Observes the sector; keeps the target under observa reporting change, disappearance, reappearance, movement effect.

4. Draws panoramic sketch or map of sector.

5. When not otherwise engaged makes such special obse tions or keeps such data as may be required by the captai the instrument sergeant.

Scout No. 1.

1. Acts as route marker.

2. Marks line of guns.

3. Asks the captain or operator No. 1, if not already infor as to:

(*a*) Direction of fire.

(*b*) Aiming point.

(c) If he is to mark a flank gun.

(*d*) Kind of communication.

4. Acts as recorder for operator No. 1, or otherwise as him in maintaining communication with the battery station.

5. Acts as recorder for the executive.

Telephone Corporal.

1. Under general supervision of the instrument sergean charge of and responsible for all the signal equipment o battery. He makes such tests and repairs as may be author and at the first opportunity reports to the captain all tr which he can not remedy.

2. Acts as route marker.

3. Asks the captain what kind of communication to estab and is responsible that same is established quickly and ciently.

4. Acts as operator at battery station on the battalion li

. When verbal communication is used, he may be required to
nsmit or relay commands to the battery.
. Reports to the instrument sergeant or captain when com-
nication is established with the battery or with the battalion
ion and any breaks occurring.

Operator No. 2.

. Acts as route marker.
. Assists the horse holder in placing and linking the horses
the detail.
. Under direction of the telephone corporal, establishes the
d of communication ordered and acts as operator at the bat-
y station.
. Reports to the telephone corporal or to the captain when
munication with the battery is established or broken.

Operator No. 1.

. Acts as route marker.
. Marks line of guns.
. Asks the captain or scout No. 1, if not already informed,
to:
a) Direction of fire.
b) Aiming point.
c) If he is to mark a flank gun.
d) Kind of communication.
. Assists in establishing the kind of communication ordered
l acts as operator at the battery.
. Reports to the executive when communication has been
ablished with the battery station and any break occurring.

First Sergeant.

. Marks the route.
. Asks the captain, if not already informed, as to:
a) Position for the combat train, whenever the battery com-
train is posted separately .

(b) Gait for the battery to use in approaching the position.

(c) Any necessary instructions relative to the formation and manner in which the battery should approach and occupy the position.

(d) The aiming point.

(e) The position of the limbers.

Operator No. 2.

Bugler.

1. Acts as horseholder for the captain.

2. Watches or assists in holding all the horses belonging to the detail.

Agent.

1. Acts as agent between the battalion commander and the battery commander.

Horseholder.

1. Asks the captain where to place the horses of the detail and is responsible that they are secured in that place.

1616. When the detail is reduced the duties may be advantageously distributed as follows:

First Sergeant.

Distribution of duties.

Members retained.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.	Operator No. 2.	Operator No. 1.
Instrument sergeant Gun Rangefinder	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1. Operator No. 1.	Telephone corporal.	Operator No. 2.	
Scout No. 2 Scout No. 1 Telephone corporal Operator No. 2							
Instrument sergeant Range finder	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1. Operator No. 1.	Telephone corporal Operator No. 2.		
Scout No. 2 Scout No. 1 Telephone corporal Instrument sergeant Range finder	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1. Operator No. 1.	Telephone corporal Operator No. 2.		
Scout No. 2 Scout No. 1 Instrument sergeant Scout No. 2 Scout No. 1	Instrument sergeant.	Range finder.	Scout No. 2. Range finder.	Scout No. 1. Operator No. 1.	Telephone corporal Operator No. 2.		

SECTION III.—USE OF THE BATTALION, BATTERY, AND COMBAT TRAIN DETAILS IN THE RECONNAISSANCE AND OCCUPATION OF A BATTALION POSITION.

1617. Two principles are fundamental:

(*a*) Battalion agents will be used only by the specific order of the major or by his express authority in each case.

(*b*) Battery commanders' details will be left at the disposal of their captains, the only exception being their rarely occasional use in supplementing the battalion detail in marking the route or as connecting files, or for security.

1618. The method of employing details in the reconnaissance and occupation of a battalion position must be sufficiently flexible to be adapted to varied conditions and circumstances. But training the details to a degree of efficient teamwork essential to the effectiveness of the tactical unit a carefully planned system can profitably be employed as a guide. Confusion, indecision, misunderstanding, and annoying and demoralizing delays are the results of training in which plan, system, and method play no part. Such a system is outlined below. Its application to concrete problems will greatly vary.

1619. Each captain sends the agent to the major as soon as his battery is in order. When contact with the enemy is expected the battery reconnaissance officer is likewise sent to report to the major. When the battery combat trains are united, each battalion group of trains also sends an officer to the major to act as agent. He is usually accompanied by four mounted men. After the position of the combat train has been reconnoitered each chief mechanic is sent to report to the executive of his battery and thereafter acts as agent between the firing battery and its combat train. The fourth man acts as orderly and horse holder.

1620. In the use of the details two general cases will arise, first, those in which battalion reconnaissance to the host front must be made in order to gain contact with the enemy

:o determine his location and dispositions; second, those in
ch such reconnaissance is unnecessary, the major having
ı ordered to take up a position already reconnoitered and
cted by a higher commander. In either case the major will
itually precede his battalion. He will ordinarily have his
tains with him. Sometimes they will join him en route.
en occupation of position appears imminent, the major
uld send for his captains and their details or cause them
narch at the head of the leading battery. In exceptional
es he will have to send for them after the position has been
cted.

621. It is desirable that a commander should reach a posi-
ı in ample time for complete and careful reconnaissance, for
formulation of a definite plan, and for issuing the necessary
ers so that the position may be occupied and effective fire
ned without confusion or delay.

622. The battalion detail is formed by the sergeant major
l is reported by him to the adjutant.

623. Whenever desirable and practicable the major assem-
ı all officers of the battalion as well as the details for the
pose of giving information and instructions.

!aptains verify their officers and details and report to the
jor. Such officers and details as may be required having
n assembled, the major gives information, instructions, and
ers covering such of the following points as may be
essary:

. Information of the enemy and of our supporting troops.

. Plans and orders of the higher commander.

. Plan of the major for the execution of these orders:

a) Approximate distance to and general location of the
ition to be occupied.

b) General description of the route to be followed; whether
ler cover or exposed.

c) The point, if any, at which the battalion shall await
ther orders.

(*d*) Special instructions to the individual batteries, including:

1. Whether or not the batteries march together, with a description of any separate routes to be followed.

2. Order of march. Unless otherwise directed, in the absence of the major the captain of the executive of the leading battery conducts the march.

3. Rate of march if miles per hour if not beyond his control on account of the movement of other troops.

(*e*) Special instructions for the combat train, including:

1. To march with or separate from the battalion, with a description of any independent route directed.

2. Probable location with respect to the selected position.

3. Whether the major or the combat-train commander will select and reconnoiter the position.

4. What is known concerning the location of the ammunition distributing station.

5. Special arrangements, if any, regarding communication with the individual batteries.

(*f*) Special instructions to the adjutant with reference to reconnaissance or marking the route or connecting, including any special signals to be employed.

(*g*) Any other necessary instructions, such as:

1. Whether or not the captains with their details will march at the head of the column.

2. Whether or not the major is going ahead at once.

3. Whether the battery details will assist to mark the route or to connect.

The command Posts is given when all orders and instructions have been announced.

1624. When marching at the head of the column, the battalion detail and those attached may be conveniently formed as follows:

Formation.			Order from left to right.
0	0	0	Combat-train agent; adjutant; major.
0	0	0	Orderlies.
0	0	0	Battalion agents to batteries C, B, A.
0	0	0	Reconnaissance officers of batteries C, B, A.
0	0	0	Orderlies.
	0	0	Bugler; sergeant major.
0	0	0	Scout corporals, Nos. 1, 2, and 3.
0	0	0	0 Scout privates, Nos. 1, 2, 3, and 4.
0	0	0	Combat-train agents to batteries C, B, A.

25. If the battery details are directed to march at the head e column, the captains and their orderlies follow the order of the major and the adjutant; and their details, in the r of the batteries in column of route; follow the battalion chment. The battalion signal detail and reel cart follow ast battery detail.

26. Whenever the major is to leave the battalion in charge ed by the captains, he either assembles and informs them informs the senior captain or the commanding officer of ading battery as to:

Any later developments or orders regarding the situation.
Whether captains will follow at once or wait until sent for.
Route to be followed:

) "Bring the battalion on and halt at ——," designating and route of approach, or indicating same on a map; or,
) "I will mark the route"; or,
) "Battery details will connect," (exceptional); or,
) "Battery details will assist by marking the route." (Exonal.)

Rate of march in miles per hour.

Any other important orders or information, including, if sary, time and place for subdivision.

soon as these instructions are given, the major, in order to time, may at once go ahead. The battalion sergeant major s the route for the batteries to follow. To do this he calls er at each point where he desires one placed, and the

enlisted personnel of the detachment, except the battery age drop off at that command in the order from left to right from rear to front of the column. At a suitable point not from the position the adjutant may call out **Last marker.** that command the next marker in order takes post at t point. This designation is transmitted to each marker in t as he arrives. When the battalion approaches, the lea commander is warned, **Last marker,** and causes the batta to take the most suitable formation under sufficient cover mitted by the terrain; for example, line of batteries in do section column. The batteries remain in this position they receive orders from their captains or until further or are received from the major.

Upon the receipt of further orders, the officer conducting march sends or signals for the personnel necessary and mits the instructions of the major.

1627. If the battery details have been ordered to co they move out at once at a gait designed to overtake the the leading instrument sergeant following the route marke the battalion detail. The instrument sergeant of the detail the rear battery causes its members to be posted in the ord which they call off, at such places that each man will pre touch with the one next nearer the battalion. The signals and **Forward** are relayed through these connecting files. signal **Enemy in sight** (both arms extended vertically over is similarly relayed from the major to the battalion and **Battery commanders report, details mark the route.** W messages may be relayed from front to rear or from r front. Oral messages are sent by agents.

When the details are used as connecting files, the cap unless otherwise directed, and the first sergeants alway main at the head of the battalion.

1628. If, while the battery details are acting as conn files, the signal **Enemy in sight** is received, the senior, or ing, captain instructs the leading executive to follow the marked, and the captains, unless they have already been

and their first sergeants ride forward to report to the
or. As the first sergeant of the rear battery in the column
s forward, he collects his detail and places them as route
kers, the instrument sergeant falling out and accompanying
captain. As soon as the members of the rear detail are
ed as route markers, the first sergeant of the center battery
inues the marking with his detail, and he in turn is fol-
d by the first sergeant of the leading battery. Thus, if the
e is long or lies through difficult country, the captains may
h the major with their orderlies, instrument sergeants, and
sergeants only. If the major, on leaving the battalion, has
cted that the route be marked by the battery details, the
ils are used in the manner first described.

129. Whenever the route is marked the leading executive
lies the signal corporal, who then takes the reel cart ahead
trot to report to the major. In guiding the reel cart over
route marked, the markers are careful not to move on after
aling to and receiving the countersignal from the signal
oral (1584).

130. On approaching an observing station the adjutant and
sergeant major exercise particular care to keep the detail
er cover, provided cover is available. Ordinarily the detail
s under cover, while the major and the adjutant ride for-
d to observe or to report to a higher commander. The
or and the adjutant usually dismount and turn over their
es to their orderlies before they become exposed.

131. On completing his preliminary reconnaissance, or hav-
received his orders from a higher commander, the major or
adjutant calls Detail or signals by three blasts of the whistle.
officer from the combat train, the reconnaissance officers,
t corporals, and the sergeant major dismount and turn over
r horses, the officers to their orderlies, the scout corporals
he scout privates or to the reconnaissance officer's horse
ers, and the sergeant major to the battalion musician. If
major desires only the officers and the sergeant major to

report his calls Officers. The officers and men are careful not to expose themselves while reporting to the major.

1662. The major then gives information, instructions, and orders covering such of the following points as may be necessary:

1. Any later information regarding the situation.
2. The general front and limits of the battalion position.
3. The limits of the target sector, with the location of the enemy and friendly troops.
4. The major's station.
5. The locality, in general, where the horses of the detachments are to be held or linked and watched, under charge of the battalion bugler.
6. The rendezvous point for the captains with their detachments, a well-concealed point close to the battalion station, but always the point at which the major wishes the captains to report to him.
7. The special reconnaissance of the position which the major desires made by designated reconnaissance officers or scouts.
8. Other special tasks for the reconnaissance officers and scouts, with the adjutant in charge, such as:
   (a) Designation of flank or auxiliary observers.
   (b) Communication with the higher commander.
   (c) Communication with the troops supported by the battalion.
   (d) Panoramic or position sketches required.
   (e) Reconnaissance or maps of routes to front or rear.
9. Orders to the agent of the combat train covering movements and posts.

1663. An officer or scout ordered to reconnoiter a battalion position notes and reports on the following points:

1. Size (whether large enough for the battery).
2. Cover (what defilade can be secured).
3. Field of fire (whether or not designated sector can be covered).

Observing stations (whether or not good field of view can
)tained).
Kind of communication (whether or not necessary to em-
other than voice).
Approaches and exits (whether covered or exposed).
Protection of flanks (whether afforded by friendly troops
y natural features of the terrain).
Aiming points.
Presence of friendly troops, if known.
. Indication of the enemy.
. Position for the limbers.

634. As a rule the major, as soon as his instructions are
n, rides over and familiarizes himself with the position to be
pied. If he has sufficient time he locates the battery posi-
s within narrow limits. He may find it advisable, unless his
ains are present, to leave an agent to mark the position of
i battery. Each agent so left rejoins the major as soon as
has given the necessary information to the captain con-
ed. The adjutant, if not already there, goes to the bat-
)n station where he executes the orders of the major and
)s in touch with the tactical situation. If the adjutant has
i given a task which takes him from the station, which
uld be an exceptional case, the major himself goes or re-
ns there.

635. The major usually sends the agent of the group of
bat trains, accompanied by the battery agents of the train,
reconnoiter the position for the combat train. The other
nts remain at the major's disposal and are to be used by
ers only by his specific authority in each case. The battalion
ler accompanies the sergeant major to the rendezvous point
the captains. As soon as the reel cart arrives the sergeant
or removes the necessary instruments and has them carried
he station.

636. After receiving the orders of the major the battalion
ibat train agent makes a detailed reconnaissance of the posi-

(b) Gait for the battery to use in approaching the position.

(c) Any necessary instructions relative to the formation and manner in which the battery should approach and occupy the position.

(d) The aiming point.

(e) The position of the limbers.

Bugler.

1. Acts as horseholder for the captain.

2. Watches or assists in holding all the horses belonging to the detail.

Agent.

1. Acts as agent between the battalion commander and battery commander.

Horseholder.

1. Asks the captain where to place the horses of the detail and is responsible that they are secured in that place.

1616. When the detail is reduced the duties may be advantageously distributed as follows:

Members retained.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.	Operator No. 2.	Operator No. 1.
Instrument sergeant.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.	Operator No. 2.	
Range finder				Operator No. 1.			
Scout No. 2							
Scout No. 1							
Telephone corporal							
Operator No. 2							
Instrument sergeant.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.		
Range finder				Operator No. 1.	Operator No. 2.		
Scout No. 2							
Scout No. 1							
Telephone corporal							
Instrument sergeant.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.		
Range finder				Operator No. 1.	Operator No. 2.		
Scout No. 2							
Scout No. 1							
Instrument sergeant.	Instrument sergeant.	Range finder.	Scout No. 2.	Scout No. 1.	Telephone corporal.		
Scout No. 2				Operator No. 1.	Operator No. 2.		
Scout No. 1							
1650				1610			

flag messages to or from reconnaissance officers, auxiliary observers, agents with friendly troops, etc.

1643. The signal corporal, assisted by the signal private, acts as operator at the battalion station. These two learn from the adjutant what artificial cover is necessary at the battalion station and, assisted by the agents and the battalion musician, construct the same at the first opportunity. A caisson may be taken from the combat train for use as cover at the battalion station. When wire communication is established between the higher commander and the major the signal private is the operator at the major's station.

1644. One of the agents remains in an unexposed position within hearing distance of the station. The other agents remain with and give their attention to their horses at the rear of the horses belonging to the detail.

1645. In the advance to a position, if reconnaissance to the front is directed, it is conducted under the adjutant by the three battery reconnaissance officers and the six battalion scouts. The sergeant major assists the adjutant by superintending the details of sending and receiving messages. The adjutant should exercise the greatest care to see that these officers and men, before going out, are suitably mounted and equipped and thoroughly understand their duties. Available maps should be consulted and the territory to be covered should, if practicable, be divided into sectors, an officer and two scouts being assigned to each. Before going out these men should be able to answer the following questions:

1. Where is the enemy or where is he supposed to be?
2. Where are our troops? Are friendly scouts, patrols, or troops likely to be encountered?
3. What information is desired; what is my mission?
4. What features are of especial importance?
5. What general direction is to be followed?
6. Where and to whom are messages and reports to be sent?
7. Are negative reports to be sent in; if so, how often and from what places?

. When am I to return, or at what place am I finally to ort?

While such reconnaissance is under way, the major, with the jutant, is well in advance of the battalion, conducting the rch.

646. Following is a summary of duties in the battalion ail:

Battalion Sergeant Major.

1. In general charge of the instruments and equipment used the detail.
2. Forms and commands the detail.
3. Marks the route for the batteries or for the battery details follow.
4. Keeps the detail under cover when approaching or in the inity of an observing position.
5. Accompanies and assists the adjutant in sending and re- ving messages when the detail is reconnoitering to the front.
6. Ascertains from the adjutant or major:

(*a*) The rendezvous point at which to assemble the captains, eir details, and the reel cart and instructs a scout or scouts watch for and guide them to it.

(*b*) The general location of a post suitable for the horses of icers and detail and instructs the battalion bugler to recon- iter it and properly secure the horses there.

(*c*) The location of the battalion and battery stations and e orders relative to communication between them.

7. Assisted by the signal corporal, removes from the reel rt all necessary instruments; sets up the battalion com- inder's telescope.
8. Superintends the work of the signal corporal and signal lvate in establishing communication with the batteries.
9. In general charge of all messages received or sent by flag agent from the battalion station.

(*a*) Keeps a chronological record of all important messages ceived or sent.

(*b*) Assists the scouts in sending or receiving flag messages to or from reconnoissance officers, auxiliary observers, combat train, etc.

Signal Corporal.

1. Under general supervision of the battalion sergeant major has charge of and is responsible for all the signal equipment of the battalion; makes such tests and repairs as he may be authorized to make and at the first opportunity reports to the adjutant all trouble which he can not remedy.

2. In charge of the reel cart on the march.

3. Learns from the leading executive when the route is ordered marked and at once takes the reel cart forward at a collected trot to report to the major.

4. Under the direction of the battalion sergeant major, lays the wire and establishes the kind of communication ordered.

5. After the instruments are removed and the wire laid, sees that the reel cart or the unhitched horses are taken to a place of safety and properly cared for by the drivers.

6. Acts as operator at the battalion station, reporting to the adjutant or major when communication with the various batteries is established or broken.

7. Learns from the adjutant or major what artificial cover is required for the station and, assisted by the signal private and the agents, constructs it at the first opportunity.

8. Upon quitting the position, reels up the wire and sees that the instruments are collected and properly packed.

Signal Private.

1. Assists the signal corporal in caring for the reel cart and its accessories.

2. Rides on the reel cart, handling the brake, while paying out or reeling in the wire, and thereafter assists the signal corporal in establishing the communication ordered.

3. Assists in constructing artificial cover for the station.

Acts as recorder for the signal corporal.

In case of communication by wire with the regimental nander, acts as operator on the regimental wire at the ılion station.

Agents.

Until all elements of the command are in position, agents especially careful, even without instructions, to watch for render information to the reel cart, captains, officers, men ıe various details, and others entitled to it.

Under the direction of the major, maintain communication ·een the various elements of the command.

Each agent must:

:) Keep himself informed as to the location of the elements he command, so that he can furnish this information to :rs.

)) Seek the best routes of approach and study the ground ınd around the position, so that he will be able to guide ıents into new positions and to transmit information be-:n the major and neighboring troops.

Agents must keep in mind the following:

ı) Before starting with a message, they ask the following ıtions, if their information is not clear:

What is the official designation of the one to whom the sage is to be delivered?

Where is the person to whom it is to be delivered?

What is the best and shortest way there, or can I be n a map of the route?

Am I to report back as soon as the message is delivered; ot, to whom shall I report?

)) Important messages in writing should have their purport erstood by the bearer so that, if necessary, they may be royed to prevent their falling into the hands of the enemy.

:) On the envelope containing a written message is written:

Name of messenger.

Date and hour of departure, as: 22 Feb., 15, 9.40 a. m.

3. Rate of speed.

(*d*) Agents must understand how to ride at the differ rates of speed (360).

(*e*) If mounted and ordered to deliver a message, and hour of departure and rate are not indicated, they ask them.

(*f*) At all times they keep informed as to the location their own units.

(*g*) Note carefully the country traversed.

(*h*) Move promptly when on an errand. All military pers are required to render assistance in expediting movements agents.

(*i*) On reaching destination, call out designation of pers sought.

(*j*) Having delivered message:

(*a*) Ask if there is any reply.

(*b*) If receiver forgets to do so, ask that he initial envelope and record hour and date thereon.

(*k*) If aware of the nature of the message carried, after livering it report any circumstances affecting the situati which have arisen since leaving the sender.

(*l*) Always repeat a verbal message, word for word, in presence of the sender, **making certain they understand meaning of the message.**

(*m*) After diligent search, if the person to whom the mess is sent can not be found, endeavor to find some other pers who can take full advantage of the information con Whether or not this can be done, always report back sender with full statement of facts in the case.

(*n*) Unless otherwise directed, always report back to sender, whether or not the message was delivered.

(*o*) When a messenger carries a message unsealed, or marked "Confidential," he will permit commanders along route to read it. He sees that they initial the envelope record the hour and date when they read the contents. Whe is desirable that neighboring troops get information fro

ssage sent to a superior, that fact is noted on the envelope, l it is the duty of the messenger to see that they get it. He st see that they initial the envelope and record the hour and te thereon.

Scouts.

l. Act as route markers.

2. Usually operate in pairs, a scout corporal and scout private th each reconnaissance officer.

3. Understand the duties of carrying information as outlined der **Agents.**

4. Regarding reports, scouts must keep in mind the following:

(*a*) Word a report like a telegram, brief and clear, but omit thing that is important.

(*b*) Write legibly. The person receiving it should have no fficulty in making it out.

(*c*) Names of persons and places should be in block letters.

(*d*) Avoid vagueness; be accurate; report facts.

(*e*) Report hearsay information as such, and state its source.

(*f*) Always give the reason for surmises.

(*g*) A report about the enemy should answer the following estions:

1. By whom seen?
2. How many?
3. What arm?
4. Where?
5. What doing?
6. At what time seen?

(*h*) A report is of no value unless it gives:

1. Designation of sender or sending detachment.
2. Place.
3. Date and hour, as 4 February, 1908, 2.45 p. m.
4. Signature, writer's surname and rank.

(*i*) When more than one report may be sent by the same scout the same recipient, reports should be numbered consecutively.

(*j*) Copies should be kept of important messages or reports.

(*k*) Remember that "negative" reports are often of great importance. They show "where" the enemy is not; where the scout or patrol is; and that the patrol is still working or is not captured.

(*l*) Always use compass bearings in reports, never "right" or "left" except with regard to the banks of a river.

(*m*) Avoid indefinite expressions, such as "infront of," "behind," "on this side," "beyond," etc.

(*n*) Roads are designated by connecting two or more names of places on the road with dashes, as: Natches Gate–Concrete Ford road.

(*o*) A message or report should state what the scout or patrol is going to do next.

(*p*) Use common sense in reporting. Useless reports hamper a commander and waste his time.

(*q*) In making a verbal report think out before hand what is to be said; give the report coolly and take care that it is not misunderstood.

Battalion Bugler.

1. At the firing position learns from the sergeant major where the horses belonging to the detail will be posted, reconnoiters the place, and directs all orderlies and horseholders to this point.

2. Is in charge of the horses and sees that they are properly linked or otherwise secured and watched; takes or sends for horse called for from the battalion station.

3. Takes post near and assists the battalion sergeant major when not otherwise engaged.

Major's Orderly.

1. Acts as horseholder for the battalion commander.

2. When not being used by the battalion commander, watches or assists in holding horses belonging to any member of the detail.

Adjutant's Orderly.

Acts as horseholder for the adjutant
When not being used by the adjutant, watches or assists
lding horses belonging to any member of the detail.

PTER VII.—ADVANCE TO AND OCCUPATION OF THE POSITION.

SECTION I.—THE FIRING BATTERIES.

17. When the major and captains ride forward on reconance the executive of the leading battery of each battalion ates the march of the battalion in accordance with the s which he receives.

18. Ordinarily battery commanders, after completing their inary reconnaissance and arrangements for opening fire, emain in observation of the terrain and targets assigned to . If necessary, however, they may meet their batteries a distance in rear of the position and personally conduct into the position selected. This necessity must frequently in the occupation of a position for direct laying.

19. Battery commanders usually send their first sergeants t as guides and to transmit instructions to the executive occupation of the firing position (**1608**). In joining their ttives each first sergeant rides over the route to be followed s battery during the immediate approach to the position. information thus gained is transmitted to the executive in ion to the instructions of the captain.

20. Every effort is made to complete the reconnaissance at the first sergeants may rejoin their batteries in ample to avoid any interruption of the advance of the batteries. s is not practicable and the batteries must be halted every ution must be taken that they make the utmost use of ible cover (**1626**).

21. Upon the arrival of the first sergeant each executive at proceeds to carry out the instructions of his captain, taking not to interfere with the movements of other batteries.

1652. If not inconsistent with the requirements of the tactical situation, concealment from the enemy's view is always to be sought during the approach to and occupation of the position. The possibility of action by surprise is thus secured.

Reconnoitering parties, scouts, and other members of the headquarters detachment must operate so as to avoid indicating the position which is to be occupied. If exposure is necessary it should not occur in the neighborhood of the chosen position.

The necessity must be borne in mind of remaining concealed not only from ground occupied by the troops to be attacked but also from ground on which hostile observing stations may be located.

To avoid raising dust, movements in the neighborhood of a masked position should habitually be made at a walk. If exposure in the route of approach is unavoidable, such places shall be passed at a rapid gait, and, if necessary, by the successive movements of carriages.

1653. Movements of the guns by hand are often unavoidable but every effort is to be made to reduce this labor. By proper reconnaissance the exact positions which the guns are to occupy may be determined. These should then be drawn by the horses as close to the positions as the circumstances warrant.

1654. A definite decision must be made as to the extent to which a masked occupation of the position is permissible or possible. If the occupation of the position will be at all visible to the enemy, delay in getting the horses away from the battery and in establishing the guns and caissons in position may be fatal. It is preferable in such cases to require the horses to bring the guns boldly to positions from which they can immediately open fire, without any manhandling whatever. Careful preliminary training permits this to be done promptly, without confusion, and with minimum exposure of personnel and animals.

When the circumstances warrant it, however, it is always preferable to unlimber under cover. If direct laying is to be employed, the guns are run up by hand, after unlimbering, until each gunner can just see his target through the sights.

roaching the position from the flank in double-section col-
the guns may be drawn most nearly to the positions which
are to occupy, while still keeping the horses concealed from
r. Causing the drivers and cannoneers to dismount still
her promotes close approach and concealment from view.
drivers should not be dismounted, however, if the battery
kely to come under fire. By requiring all individuals to keep
er cover and by avoiding all movements on the crest, a posi-
may readily be occupied without the knowledge of the
my.

655. Before the arrival of his guns, each battery commander
uld have determined exactly where they should be posted
that their front will be approximately normal to the pro-
ed line of fire, and so that each gunner will surely be able
ee the target or aiming point, as the case may be (1605–
07).

656. The approach to and occupation of positions under
er of darkness is of frequent occurrence. In such cases the
te and all the details of the movement must be determined
advance by reconnaissance during the day. It is usually
irable to post markers along the route to be followed before
ntfall. Such markers must be at close intervals.

657. Immediately upon establishing the guns the executive
es steps to guard the communications with the battery sta-
n. As soon as possible after occupying the position he begins
preparation of artificial cover from both fire and observation
674). When the communication with the battery commander
other than by voice, he is also responsible for posting ob-
vers and taking other measures for providing security against
se attack.

Although these duties are habitually incumbent upon the ex-
tive, the captain is not relieved from the duty of foreseeing
l giving such special instructions as the conditions require.

658. As soon as the carriages have been unlimbered each
t sergeant conducts the limbers of his firing battery to the
sition designated for them and forms them to facilitate prompt

movement and to take advantage of available cover (1556). He maintains strict order and discipline among the limbers at all times. If dismounted no driver is allowed to leave the heads of his horses unless he is replaced.

The limbers being posted, the first sergeant stations a man to watch for and transmit signals from the executive.

If the horses are heated and the atmosphere is chilly, the health of the animals may be endangered by letting them stand. Under such circumstances, and when the position of the limbers will not be exposed thereby, the first sergeant puts them in a quadrangle or circle and walks the horses until normal temperature and respiration have been restored. If the weather is severe the same method is adopted to keep drivers and horses from suffering with the cold.

Section II.—Battalion and Battery Combat Trains.

1659. The position for the group of combat trains can ordinarily be selected and the agent dispatched (**1636**) in ample time to guide the train to its position.

1660. Upon reaching the position the commander of the group posts it to facilitate movement and to utilize the available cover (**1557**). Ordinarily the carriages are posted with sufficient intervals to permit the free passage of vehicles which may be brought up.

1661. Having posted his train the group commander sends the agent who has guided him to the position to report to the major. He then informs himself as to the position of the distributing station and assures himself that communication and the supply of ammunition to his group are maintained.

1662. If on approaching the position of the firing battery the group commander has not received instructions as to the position he is to take, he halts his train under cover, reconnoiters and selects a position. Having posted his train he immediately takes steps to establish communication with his battalion and battery commanders and with the ammunition train

663. During the action the group commander orders such vements of the combat trains as his instructions and the elopments of the action may from time to time require; he s every means in his power to ensure the uninterrupted ply of ammunition from the combat trains to the batteries the one hand, from the ammunition train to the combat ins on the other.

664. Each firing battery is, as a rule, furnished with amnition directly from its own combat train, the chief mechanic nsmitting the orders of his executive or battery commander to the amount required and the manner in which it is to be nsferred. The combat train commander makes such transfers ammunition within his group and takes such other steps as ll insure his ability to supply the demand from any battery. Except in emergencies, requests from other battalions for munition are honored only on the order of higher authority.

1665. The group commander keeps the battalion commander stantly informed as to the state of his ammunition supply.

1666. When a battery acts independently the battery combat in is handled in conformity with the general principles enunted for the group. In such cases the chief mechanic joins the ttery commander as soon as the battery is subdivided for tion. The chief mechanic performs the duties of reconnaisnce and guiding the battery combat train to its position preribed in the case of the agent of the group. The train having en established, the chief mechanic reports to the executive as fore.

CHAPTER VIII.—CHANGES OF POSITION.

1667. If the conditions permit, it is most important to post tillry at the outset in positions from which it can act effecrely throughout the various phases of the engagement. This nsideration should be kept in mind in forming the plan of tion and in utilizing the available ground.

If guns are rendering effective service, changes of position in the midst of an engagement should be made only when some very distinct advantage will thereby be gained. Changes involve interruption of fire, necessitate dismantling and reestablishing communication, a fresh orientation of the command and a new adjustment, and, if made in the view of a vigorous enemy, are apt to result in paralyzing losses in men and animals. A reduction of the range is not in itself ordinarily sufficient to warrant such a change, provided the guns are doing effective work and their continuous action is important.

1668. Nevertheless, as an action develops changes of position may be essential, whether to secure a more desirable position on the front of flank, or to reach positions for covering a movement to the rear. Artillery commanders must anticipate and prepare for such movements. Reconnaissance officers and scouts must be employed to reconnoiter and select routes, to remove obstacles, to perform such pioneer work as may be needed, and to prepare themselves to guide organizations over the routes selected.

1669. Officers commanding batteries, battalions, and the higher units of artillery habitually precede their organizations to the new position for purposes of reconnaissance as soon as the conditions of the case admit. If the movement is made under fire, however, it may be best for battery commanders to remain with their batteries, sending a lieutenant with the battery detail for reconnaissance. When the batteries of the battalion are acting together the major decides whether or not the captains are to remain with their batteries during a change of position.

When a retreat is in question the artillery commander must decide whether it is more important for him to conduct the withdrawal of the rearmost batteries or personally to select new positions from which to cover the retreat. If the artillery commander does not remain with the rearmost batteries, he must definitely assign the duty of determining how long they are to remain in action to the senior officer with them. When the commander remains with the rearmost batteries a senior artillery

r should be designated to reconnoiter and give orders as to ccupation of positions to the rear.

70. Changes of position are always made under cover if icable, the importance of occupying the new position with- he enemy's knowledge and of opening upon him by surprise always kept in mind.

71. In many cases the change of position can be made only ght. In such cases the movement must ordinarily be made out lights, in the utmost quiet, and every precaution must ken to avoid losing the route. Scouts must be sent out in laytime to go over the ground and pick out the best route to new position. In difficult cases, as, for example, in move- ts over country where roads are not available, it is advisable lect landmarks or stations along the selected route and move iously from one to the other. Markers at close intervals are ed before dark and left in position until the head of the mn passes.

72. If a hasty movement is imperatively demanded, great es may be avoided by skillfully using the cover afforded by ground and by moving rapidly over spaces where exposure evitable. If the guns are under effective fire of the enemy's ntry or Artillery, a change of position should not be at- pted, as it is impracticable to bring up the horses for lim- ng; in such cases a lull in the action must be utilized for ing the guns to a position in which they can be limbered er cover. If a repulse is imminent and the guns are being atened by the enemy's advancing troops, then the oppor- ty for withdrawing must be gained by beating back the ny and securing at least temporary immunity from his fire. s useless to bring up the horses under close and effective ile fire. On the other hand, Artillery, as long as it has unition, should be able thoroughly to protect its own front. the last, officers and men should take shelter among the iages and with their pistols force the enemy to pay the rest price for the possession of the guns.

1673. Changes of position of the larger bodies of Artill are usually made by echelon, a portion of the force being al always in position to cover the movement of the remainder. A single battery, however, is not ordinarily echeloned for a cha of position; but when a movement has to be made across a fi swept zone, it may be necessary to move by single carriages.

1674. The formation to be adopted for a change of positi must be extremely flexible, so that the march may be most re ily adapted to the lay of the ground and so that changes formation will be necessitated as little as possible by obstac which may be met. For individual batteries, flank column double-section column is ordinarily to be recommended. T larger units should endeavor to move on as large a front as po sible and with wide intervals; if they must move in colu then the distances should be considerably increased.

1675. The gaits to be employed in a change of positi determined entirely by the conditions of the case. When a movement has to be begun in the midst of great excitem however, it is habitually commenced at a walk, so as to ste the command and avoid the possibility of confusion.

1676. A change of position by certain batteries may be nec sitated by the fact that the enemy has succeeded in locati them and in securing the ascendancy of fire. A short mo ment by hand during a lull in the fire may be sufficient in su cases.

1677. It is the province of the commander of the troops order changes of position of Artillery. When emergencies ar however, which do not admit of reference to higher auth the Artillery commander on the spot must act promptly an decisively, moving the guns if necessary so as to be able deliver the fire which will best meet the new situation wh has arisen. His action should be at once reported to the higher authority. It is of the utmost importance, however, th the plans of the higher commander should be well known to subordinates, so that they may exercise intelligent initiative conformity with those plans.

678. When an important change of position is imminent it pecially important that the ammunition chests of the firing ery be fully replenished, in readiness for the movement.

battery which has expended all its ammunition does not for reason retire; it secures a fresh supply. While awaiting enishment it shelters the unemployed personnel.

disabled gun is not sent to the rear during the action; if it not be repaired on the firing line, it is left there.

itteries are not relieved, but are supported by fresh bat- s.

atteries will not retire, even in the face of imminent danger, iout orders. The loss of well-served guns in the defense of sition or in close support of the other arms is honorable.

CHAPTER IX.—COMBAT.

SECTION I.—WITH THE ADVANCE GUARD.

679. The action of Field Artillery with an advance guard vary with the mission. It should not occupy positions from ch it can not be withdrawn without a general engagement, iaps not intended by the commander of the force. Its main ies are to break down any resistance to the advance of the er arms or to cover their retirement if necessary.

ositions with as much cover as possible should be chosen, h preservation of complete freedom of maneuver, while the s themselves should be placed at wide intervals and used h great rapidity of fire, so as to deceive the enemy, if pos- e, as to the strength of the force opposed to him.

SECTION II.—THE ATTACK.

680. In general, when large forces are engaged, the attack sents three principal phases:

· The preparation.

· The decisive action.

· Securing the victory, or averting disaster in case of failure.

he use of Artillery in the attack will vary in conformity with se different phases.

1681. In the preparatory stage Artillery has for its objec those parts of the enemy's force which at the time most o the action of our Infantry. Until our Infantry comes w effective small-arms fire the principal target will, therefo the hostile Artillery. As the progressive advance of our Inf brings them within effective rifle fire, more attention mu paid to the hostile Infantry.

Obstacles, such as walls and abatis, which impede the advan of our Infantry should, if possible, be destroyed by Artillery fi

1682. The counter batteries acting from masked positio must dominate the enemy's Artillery with the greatest possib rapidity; the Infantry or breaching batteries frequently takin on account of their more varied rôle, a less defilade than th counter batteries, open upon the hostile Infantry and obstacl The designation of batteries as counter or Infantry batteries is not permanent and may vary with the progress of the engage ment.

1683. The Artillery preparation for the Infantry attack is, in general, carried on simultaneously with the Infantry advan If, however, the enemy has fully occupied his position, or th attack is able to form under cover close to the hostile positio and thus has only a short distance to advance, the preparato may take place both before and during the attack.

1684. Before opening fire with any unit of Artillery on an objective, care must be taken to have at hand another unit ready to open upon any of the enemy's Artillery which may attempt to prevent the first unit from accomplishing its missio by forcing it to cease firing.

In order to have batteries available for this counter attack economy of forces must be practiced; no greater force must be used at first than is absolutely necessary.

1685. In the decisive attack a special preparation is neces sary. The most rapid and intense concentration of fire of all the available Artillery is brought to bear upon the objective against which the Infantry is to advance.

ring this special preparation the counter batteries continue
ume their fire on the hostile Artillery.

ne of the Infantry batteries may be sent forward to closer
ons as the attack progresses, but it is to be remembered
during such changes of positions the fire of these batteries
t to the assailant at a most critical time, and such move-
s should be avoided if possible. The range and ease of
pulation of the fire of Field Artillery enables it to dispense
maneuvers which, in the last analysis, are prejudicial to
nfantry which it is charged with supporting.

86. As our attacking Infantry reaches the danger zone of
Artillery the commander of the Infantry firing line should,
preconcerted signal—such as the display at the firing line
conspicuous and suitable flag—inform the Artillery com-
ler of the fact. The Artillery then increases its range so as
npede the movement forward of possible hostile reserves,
to take the enemy in rear in case he retreats.

87. When the third phase of the attack is reached, accom-
ing batteries will be designated from the Infantry batteries,
e mission will be to reach the captured position as soon as
ible after the Infantry, in order to pursue with their fire
etreating enemy and to aid in repulsing any offensive return.
should cover with their fire the advance of troops which
be pushing on in pursuit, and break down all efforts of the
y to reform and renew the fight.

88. In case of reverse, Artillery directs upon the enemy's
king troops every gun which can be brought to bear, in
to destroy their morale and to assist the repulsed troops
e renewed effort which may lead to victory. If the repulsed
s continue to be forced back, the Artillery must cover their
drawal, resisting the advance of the enemy, if necessary,
annihilated.

SECTION III.—THE DEFENSE.

89. The defense requires, before all things, skilful utiliza-
of the available ground in order to develop fire effect to the
t.

Exhaustive preliminary reconnaissance of the position, improvement of communications within it, determination of the ranges, especially of those to probable Artillery positions of the enemy and to points in the probable direction of the Infantry attack, are advantages which the defense must utilize so far as time permits.

1690. In most cases it will be advisable for the Artillery to be held in readiness at first, even if the position has been artificially strengthened. For this alone will insure the Artillery meeting the direction of the attack with a correct front and will prevent it being forced to premature changes of position. This also affords the best means of preventing the enemy from gaining an insight into our own dispositions and intentions before the action has commenced.

In preparing positions which may be occupied, a most extensive use is to be made of earth cover. If time permits, it is advisable to provide masks and to improve the field of fire by cutting down hedges and trees. It is of the greatest importance to place a large supply of ammunition in readiness in the immediate vicinity of the guns.

As soon as the general direction of the enemy's attack is recognized, but if possible before the enemy brings his batteries into action, the fighting position is occupied. Sometimes flanking Artillery fire can be employed with advantage to search dead angles before the fighting position.

1691. The commander of the troops will usually order the opening of fire. Firing at excessive ranges and upon small hostile detachments is to be avoided, for this assists the enemy in locating the guns.

1692. As a rule, the action will be commenced by engaging the assailant's Artillery, and, as a rule, the whole of the defender's Artillery will be employed if necessary to attain superiority.

The commander of the forces gives the general instructions for resisting the Infantry attack.

hen the enemy's Infantry advances to the attack, the Artil- must make them their target, regardless of the enemy's llery fire, if necessary leaving cover for this purpose. If ible, the enemy's batteries should at the same time be held in k, but the repulse of the Infantry attack must remain the t important feature.

, even before the Infantry attack commences, the enemy's llery proves itself so superior that it appears hopeless to inue the Artillery action, the batteries may temporarily cover from the enemy's fire. But as soon as the enemy itutes the decisive attack every gun must at once, even with- particular orders, resume the struggle and engage the ny's Infantry only, heedless of the Artillery fire. A few eries, even single ones, thrown into the struggle at unex- ed points may be of especial use at this juncture.

693. If, nevertheless, the attack succeeds, part of the Artil- must prevent the advance of hostile batteries into the cap- ed position, part must concentrate its fire upon the hostile ntry which has penetrated, and, in cooperation with the rves, expel the enemy from the captured position. This is of the tactical situations in which steadfast endurance to last is imperative. Even if it lead to the loss of the guns, is in the highest degree honorable.

Section IV.—With the Rear Guard.

694. As the principal duty of a rear guard is to gain time, as it should be able to withdraw without serious loss, it uld be strong in Field Artillery. Positions should be se- ed so as to utilize the long range of the guns to force the ny to deploy at the greatest possible distance; such positions t also afford sufficient facilities for withdrawing. In with- wing, small changes of position should be avoided, the retire- ts from one position to another being over as great a dis- e as is consistent with delaying the enemy to the utmost.

SECTION V.—HORSE ARTILLERY WITH CAVALRY.

1695. In an advance, Horse Artillery should march united and well toward the head of the main body of the Cavalry command. Ordinarily no Artillery is attached to the advance guard.

1696. In large commands there may be time for the regular issuance of orders for combat by the Cavalry commander, but frequently in large commands and very often in small commands there will be no time for consultation and the Artillery commander will receive only very brief and general instructions, if any at all. Therefore it is imperative that the Field Artillery commander be with the Cavalry commander when combat is imminent, so that he may receive his orders directly if any are to be given, or that he may get the decision and grasp the plan of action by hearing the orders for the subordinate Cavalry commanders.

1697. The horse Artillery commander must not only have great quickness, decision, and tactical instinct for successful cooperation, but he must be constantly in touch with the situation, must be constantly aware of the definite location of his units, must have them well in hand and so disposed as to meet all possible emergencies, and must have sure and rapid means of communication with them.

1698. For this reason when combat is imminent battery commanders and their details should be at the head of the leading battery of their battalion, if not further forward in the marching column.

In such cases, as the Cavalry and Artillery commanders will usually be with the advance guard, the battery commanders and their details may be brought forward and march at the rear of the advance guard.

1699. Rapidity and correctness of decision on the part of Field Artillery commanders, accuracy and rapidity of fire on the part of the enlisted personnel and mobility as regards the guns are essential to horse Artillery success.

1700. When Cavalry meets Cavalry and a mounted action is minent the friendly Cavalry will make a rapid deployment, ierally either to the front or to one of its flanks.

:n the absence of any orders, the Artillery commander must ke a quick decision as to the position to be taken up by the tillery and his command must be moved thereto with the ut-st rapidity.

A position on one or both flanks of the attacking line is gen-ılly best; a position in rear of the Cavalry attacking line is ıerally faulty, as the advance of the friendly troops masks ɜ guns too soon.

In such an action any attempt at dispersion of the horse Ar-lery into units less than a battalion is usually also faulty, for veral reasons: (*a*) Time is lacking for the necessary recon-issance and issue of orders; the limited time usually demands simple plan; (*b*) time is lacking for the concentration of fire on the most important target; (*c*) with the batteries dis-rsed, one or more batteries are almost certain to have their e masked too soon by the friendly Cavalry.

The following general rules should govern the horse Artil-y commanders in their choice of position and conduct of the tion:

(*a*) The position for the guns should be chosen with a view obtaining the most effective fire on the enemy's Cavalry pre-ous to the Cavalry charge and to covering with effective fire e area over which our charge is to be made.

(*b*) The position chosen should permit the fire of the guns to delivered up to the moment of collision, and should not mper in any way the movement of our Cavalry.

(*c*) Long-range firing at the enemy's guns is to be avoided.

(*d*) While the opposing Cavalry is the most important target, the enemy's Artillery is inflicting losses on our Cavalry, it ill be necessary to assign batteries to hold them in check. hen the fire of our guns becomes masked by the movement of r Cavalry, they may all be turned upon the enemy's Artillery.

(*e*) If the charge succeeds, the Artillery should advance as soon as possible; if it fails, the guns should form a rallying point for the Cavalry, which should invariably rally in rear of a flank and not fall back directly on the guns.

(*f*) In the mounted combat and in the pursuit by horse Artillery, indirect laying has no place.

1701. In supporting Cavalry acting dismounted, the same principles govern as herein laid down for Artillery in the field generally. The extent of front covered leads to a wide dispersion of horse Artillery units. Their rôle demands that their action should be characterized by promptness and a readiness to take the initiative. Indirect laying may be used, provided it causes no loss of time.

1702. A particular and frequent phase of action with Cavalry dismounted is an advance for the seizure of an important position.

In this case as quickly as the Cavalry advance guard has gained the position, the batteries should push rapidly forward at a rapid gait and establish themselves for its defense.

The Artillery reconnaissance details with the Cavalry advance guard should be sufficiently numerous to cause no delay in the selection of positions and in guiding the batteries thereto.

CHAPTER X.—AMMUNITION SUPPLY.

1703. The organization and operation of the divisional ammunition service is the duty of the Field Artillery. Artillery officers must, therefore, understand the principles governing the supply of small-arms ammunition as well as of Artillery ammunition and must study the dispositions suitable for the supply of the different arms in action. The principles are set forth in Field Service Regulations. Sound judgment in making suitable dispositions is to be acquired through the study of that part of the regulations of the several arms relating to combat and through the solution of tactical problems involving ammunition supply.

'04. The conditions of modern war demand very great nditures of ammunition. While such expenditures must sitatingly be made when necessary, it is the duty of comders of all grades to see that due economy is exercised and ake provision for timely replenishment of ammunition.

o means should be neglected for bringing up ammunition to ps in action and for keeping up the fire, on the maintenance hich the success of the combat may depend.

'05. The supply of ammunition is effected from the rear to front. It is the duty of the commander of each unit in the munition supply system to ascertain the position of each of units which he is to supply and to establish contact with such s. Troops engaged in battle must be kept free from all iety as to the ammunition supply.

706. The commander of the line of communications is onsible for the service of ammunition from the base to ude its delivery to the ammunition trains.

he commander of divisional trains is responsible for the duct of the ammunition train until it is released from his trol.

he commander of the ammunition train is subordinate to commander of trains until his train is released from the trol of the latter.

707. Base ammunition depots are supplied from arsenals.

dvance depots are supplied from base depots.

mmunition columns are replenished from the advance depots.

mmunition trains are replenished from the ammunition colns of the line of communications. In exceptional cases ere the rail or water heads of the line of communications sufficiently near the ammunition trains may be replenished ectly from the advance depots.

ombat trains are replenished from the divisional ammuni- trains.

he caissons of the firing battery are replenished from or laced by caissons of the combat train.

Within the firing battery ammunition is replenished as described in paragraphs 1033 to 1038.

1708. An ammunition-distributing station is the place to which combat trains are sent for resupply.

An ammunition refilling point is the place where the ammunition train is refilled.

An ammunition rendezvous point is the place to which ammunition columns of the line of communications are dispatched and where they are met by agents of ammunition trains and conducted to refilling points.

1709. Combat and ammunition trains are organized as provided in Tables of Organization.

1710. The commander of the ammunition train is the immediate subordinate of the divisional Artillery commander, after the ammunition train has been released from the control of the commander of the trains.

1711. It is the function of the commander of a unit to which a combat train is assigned to regulate the supply of ammunition from the combat train to the guns and to send the empty caissons of the combat train to the distributing station.

Empty caissons of the firing battery may often be sent directly to a distributing station.

1712. The ammunition train, as a rule, marches in rear of the main body. At the beginning of an engagement the sections of the train are directed to proceed to stations from which practicable routes radiate to the combat trains. Usually the most suitable preliminary locations will be found at a distance of from 2 to 3 miles in rear of the line of battle. Inasmuch as the expenditure of ammunition will not be the same for all parts of the line, it is, as a rule, desirable to hold the sections together during the earlier stages of the engagement. As the probable course of the engagement becomes known it may be advisable to subdivide the sections and to station the subdivisions at such places as will facilitate the resupply of the combat trains.

1713. A position selected as distributing station should afford free access from all directions and ample space for posting the

riages so as to leave room for a third carriage to be driven ween any two adjacent carriages, and should be so located as to interfere with the movements of other troops or trains.

All routes leading from a distributing station must be reconitered and arrangements made for probable movements.

1714. The position of combat trains is discussed in paraaphs 1542 to 1545 and 1659 to 1666.

1715. The commander of the ammunition train furnishes an ent to connect the field artillery commander's headquarters h the train.

Similarly the commander of a section furnishes an agent to nect with the combat train or with the headquarters of the it which the section is to supply.

1716. The positions of an ammunition train and of its secns, when detached from it, are marked by a red flag during day and by a red lantern at night.

1717. The ammunition on hand for 3-inch field guns, includ- that carried in the ammunition train, is 464 rounds per gun, tributed as follows:

	Rounds.
ith the firing battery	190
ith the combat trains	168
ith the ammunition train	106
Total	464

1718. The limbers of horse Artillery operating with Cavalry ay or may not be filled, depending on the nature of the operans, in the discretion of the horse Artillery commander. The munition train of a Cavalry division transports 53 rounds r gun.

CHAPTER XI.—FIELD ARTILLERY SUPPORTS.

1719. The security of Field Artillery on the march or in mbat must be provided for either by the distribution of the ier arms or by bodies of Infantry or Cavalry, called Artillery pports, specifically detailed for the purpose. When such is

not the case the necessary protection must be furnished by the nearest unit whose mission will permit.

1720. The Artillery commander takes general measures to insure the support of the Field Artillery. Subordinate commanders, by the suitable disposition of Artillery scouts, supplement his arrangements or, if security is not provided by the other arms, provide for early warning against surprise or attack.

1721. When operating with Infantry the detail of a support is not necessary except when the Artillery is separated from the main body or occupies a position in which its flanks are exposed. The detail of a special support is to be avoided whenever possible.

1722. When operating with Cavalry, especially against Cavalry, the detail of a support will be almost habitual for the following reasons: (*a*) In dismounted actions the dispersion is generally great, and hostile Cavalry may penetrate the intervals; (*b*) in mounted action, the Artillery is most frequently compelled to take up a flank position and is thus exposed to a flank attack; (*c*) the phases of mounted combat change so rapidly that Field Artillery amply protected by the distribution of troops at one moment may be seriously exposed the next.

1723. On the march, if there is danger to the flanks from bodies of the enemy, the Artillery may be broken into columns not longer than a regiment; it then marches like a convoy with Infantry or Cavalry in front, in or opposite the center and in the rear. On marches through long defiles, or dense forests or at night, it may be advisable to place the Artillery near the rear of the column.

The country must be thoroughly reconnoitered by patrols within long rifle range.

1724. In action the formation and location of the support must be such as to gain and give timely information of the enemy's approach and to offer actual resistance to the enemy beyond effective rifle range of the Artillery's flank. It should

ıe close enough to the Artillery to suffer from fire directed
ıe Artillery. In most cases a position somewhat to the
and rear best fulfills these conditions.

25. A support commander is charged only with safeguard-
he Artillery. The tactical employment of each arm rests
its commander. The two should cooperate through con-
ces by which the plans and orders of each are mutually
rstood.

26. Since the support is auxiliary to the Field Artillery, it
ld conform to its movements. The decision to change posi-
rests with the Artillery commander.

27. Infantry supports should not be mounted on the car-
:s or off horses except under the most unusual circum-
:es.

HAPTER XII.—TRANSPORTATION BY RAIL AND WATER.

Section 1.—By Rail.

28. The arrangement for transportation of troops by com-
ial railways is a function of the Quartermaster Corps.
enable the quartermaster properly to estimate for cars he
ld be informed as to the exact number of men and animals
the amount of matériel and equipment to be transported for
separate battery and headquarters. Except in theaters
:tual operations the quartermaster must also be given such
ized lists of property and weights as will enable him to pre-
bills of lading. To assist the quartermaster each battery
nander and each headquarters should furnish a list of the
)ers and kinds of cars required for the unit.

29. Whenever practicable sleeping cars are provided for
ersonnel on journeys of 24 hours or greater duration. Suffi-
: cars are furnished to provide a section for each three men
for each two officers. In determining the number of cars
vance must be made for employees of the sleeping car com-
and of the railroad. These employees include a porter for

each car, two cooks for each tourist kitchen car, a sleeping car conductor, and a railroad agent. Each of these employees utilizes one berth.

1730. Tourist sleepers usually contain 14 or 16 sections and tourist kitchen cars 12 sections. A standard sleeper has 13 or 14 sections, including the drawing-room and stateroom.

For the transportation of 5 officers and from 130 to 150 men 3 tourist sleepers and 1 tourist kitchen car are required. For the transportation of 5 officers and from 150 to 195 men 4 tourist sleepers and 1 tourist kitchen car are required. These figures allow for space for the railway employees.

1731. When day coaches must be utilized and the journey is considerable a seat should be provided for each man. On this basis a standard day coach will carry about 30 men.

1732. When kitchen tourist cars can not be provided and meals are to be prepared en route, a baggage car for each unit should be furnished for use as a kitchen.

1733. The carriages are transported on flat or gondola cars or occasionally in automobile cars. Flat cars are more convenient to load and unload, especially when permanent facilities are not available.

A flat car of ordinary length—about 36 feet—will carry three Artillery vehicles complete while leaving enough free space to facilitate loading and unloading. For a battery on a war footing six flat cars are thus necessary for the matériel. If the battery is on a peace footing or if the cars secured are 40 feet or more in length, five cars will suffice.

1734. Field wagons are transported on flat cars, three wagons to the car.

1735. Harness, kitchen supplies, officers' baggage, and such of the personal equipment of the men as are not necessary on the journey are carried in a baggage car provided for the purpose.

1736. Box cars are provided for forage, ammunition, and other property according to the necessities. Unless the batteries

to detrain in the theater of operation ammunition should be
d and carried in a special car.

737. Box cars are usually at least 36 feet in length. The
ior cross section is about 8 by 8 feet. The load capacity
es from 40,000 to 100,000 pounds. It is inadvisable, however,
oad a car to its capacity, and 40,000 pounds may be assumed
he load and 1,800 to 2,000 cubic feet as the cubical capacity
he average box car.

738. The weight limits the amount of ammunition and of
in which can be carried in a single box car. Cubical capacity
its the amount of military stores of other kinds, especially

welve hundred pounds, or 100 rations, of oats occupy a space
bout 40 cubic feet. Fourteen hundred pounds, or 100 rations,
baled hay occupy a space of about 120 cubic feet. When
ess must be had to forage during the journey, 1,200 rations
a suitable load for a forage car.

739. Animals are carried in stock cars or palace stock cars.
palace stock cars are not available, a box or stock car should
provided for each six privately owned officer's mounts.
he capacity of both the ordinary and the palace stock car
rages about 18 Artillery horses per car. The ordinary stock
will carry about 20 mules.

740. The amount of baggage, forage, and rations to be taken
ends upon circumstances, and should be definitely prescribed
he order directing the movement. Ordinarily rations and
ge sufficient for three days after the completion of the
ney is ample. More than this is generally unnecessary
causes delay and congestion in entraining and detraining.

741. When movement from garrison or semipermanent
ps is contemplated ample notice should be given, if possible,
hat the necessary arrangements concerning property not
aining to the field equipment may be made. Not less than
ours should be allowed for the orderly transaction of this
ness.

When sufficient time is not available for these purposes the security and care of such property as is left behind devolves upon the troops remaining in the garrison or camp.

1742. The time required for loading each train carrying Field Artillery troops depends upon the facilities for loading and especially upon the amount of equipment and supplies to be carried.

With only the equipment and supplies prescribed for organizations on the march in the field, when all ammunition is carried in the chests and when the facilities for loading are reasonably good a battery should be able to load within two hours from the time when the cars are prepared and all personnel, matériel, and equipment pertaining to the battery has arrived at the loading platforms.

1743. Delays and confusion in loading are chiefly due to lack of advance preparation of a definite and rational plan or to failure to follow such a plan during the loading. A common mistake is the attempt to rush the loading by assigning cars so as to begin the loading of all batteries simultaneously without adequate facilities or cars therefor. In general, confusion will be eliminated and time will be saved by making up each train complete before spotting it at the loading places. For the storage of cars and the making-up of trains ample switching facilities should be set aside. It is especially important that the loading platforms for any one battery be not widely separated. The number of trains which can be loaded simultaneously thus depends upon the available switching facilities. In general, the facilities available in leaving the ordinary garrison or in quitting a concentration camp by a single railroad limit the cars that can be placed to those necessary for a single battery. As, under a suitable plan, similar cars for the several batteries are loaded from the same platforms, the heavier stores for each organization may be transported to the loading platforms before the departure of the preceding organization. Care must be taken to avoid interfering with the loading and t

) the stores to be loaded on any one train separate from e going on another.

744. Sufficient tags should be kept on hand to mark all pment not carried in the cars with the men or not other- readily identified. The loading of each class of property ıld be under the immediate charge of an officer, who should all items going into each separate car, noting on each list markings and number of the car.

745. When a regiment moves by rail it is usually desirable transport regimental headquarters, the headquarters com- y, the supply company, and one battalion headquarters on train.

When a battalion moves alone the battalion headquarters y be attached for transportation to one of the batteries. In s case or when otherwise desirable the attached section of supply company may be divided among the batteries.

746. The sequence in which the various organizations move ends largely on the conditions under which the movement is de. In general, a regimental commander with his head- arters company, one of the battalion headquarters, and the pply company should move on the first train. One of the ttalion headquarters should be on the last train to leave. is sequence leaves a field officer to superintend the loading all trains, while the regimental commander with his staff s time to make the numerous arrangements necessary for the training and care of the various organizations upon their rival.

The sanitary personnel should be divided among the trains. this is impracticable, all of it should be with the last train.

1747. Whenever practicable each battery occupies one train ith all of its personnel, animals, and matériel complete. It is, wever, preferable to have trains of moderate size with good eed rather than long trains with low speed. Each battery ain must therefore be loaded so that it may be readily divided to two parts (1752).

1748. When palace stock cars can not be obtained, additional box cars for privately owned mounts at the rate of one car to six horses should be provided. When this is done the number of stock cars may be reduced by one. When tourist kitchen cars are not obtainable the number of baggage cars and of sleepers must each be increased by one.

1749. When the command is on a war footing, the cars required for the regimental headquarters, the headquarters company, the supply company, and one battalion headquarters are as follows:

Flat cars	8
Box cars for stores, harness, etc	2
Box car for forage	1
Stock cars	10
Baggage car, or box car with end doors	1
Tourist kitchen car	1
Sleeping cars	3
Total cars	25

1750. The cars required to move a light battery on a peace footing are, in the sequence in which the train is arranged, as follows:

Flat cars	5
Box car for ammunition	1
Box car for stores, harness, etc	1
Box car for forage	1
Stock cars	7
Baggage car, or box car with end doors	1
Tourist kitchen car	1
Sleeping cars	3
Total cars	20

If no boxed ammunition is to be transported, the number of box cars may be reduced by one. If no stores other than those which are carried on the march are to accompany the battery.

ie number of box cars may be further reduced. The number stock cars is sufficient to provide a separate car for privately vned mounts.

If tourist kitchen cars are not obtainable, the number of ggage cars and of sleepers must each be increased by one.

When the extra caissons for a war footing are to be taken, x flat cars are necessary unless exceptionally long cars are vailable.

1751. When the light battery is on a war footing the cars quired are:

Flat cars	6
Box car for ammunition	1
Box car for stores, harness, etc	1
Box car for forage	1
Stock cars	9
Baggage car, or box car with end doors	1
Tourist kitchen car	1
Sleeping cars	5
Total cars	25

The same remarks as to reductions and increases of cars pply as in the case of the battery on a peace footing, except at five tourist sleepers are sufficient to accommodate the personnel with but little crowding.

1752. When battery trains must be divided into two sections, e first section contains the forage car, all the stock cars, and ie sleeping car. The second section contains the remaining rs.

The first section should be under the command of one of the utenants, who should have with him the stable sergeant, the able orderly, a horseshoer, one of the mechanics, and the mber of other men that can be accommodated.

1753. When a battalion headquarters accompanies a battery, e additional tourist car and one additional stock car must provided. If it is possible to provide separate cars for privately owned animals, a second additional stock car should be

provided. The reel and cart will require an additional flat car only when the number of flat cars provided for the battery is reduced on account of extra long cars being available.

1754. If field wagons are to accompany a battery, additional flat cars at the rate of one for three wagons are provided.

1755. When one battalion headquarters and 9 of the wagons of the supply company are to move on the last train, the cars required are:

Flat cars	5
Box car for stores, harness, etc	1
Box car for forage	1
Stock cars	4
Baggage car, or box car with end doors	1
Tourist kitchen car	1
Sleeping car	1
Total cars	14

If possible, an additional stock or box car should be provided for privately owned aniamls.

1756. Horse Artillery organizations require the same number of cars as corresponding organizations of Light Artillery, with the exception of stock cars for the animals of the batteries. A horse battery on a peace footing requires 9, on a war footing 14 stock cars.

1757. When movements of large bodies of troops are involved, ordinary coaches or box cars may frequently have to be substituted for sleeping cars.

For movements of a few hours in the theater of operations the personnel may have to ride on the flat cars. As in such cases the equipment is limited, the harness and stores may be carried on the flat cars with the carriages.

1758. In preparation for the journey all personal equipment and other property needed en route are kept separate from that not needed.

ll the mechanics are provided with the heaviest hammers lable. These hammers, with a supply of nails, are taken ie cars by the mechanics.

he blanket roll of each man is tagged and the rolls of each id are tied into a bundle. These bundles, together with the ers' baggage, are carried in the baggage car.

ations and kitchen equipment which will be needed during journey or immediately upon arrival are placed under the ge of one of the cooks who sees that they are loaded in the gage car, so as to be immediately accessible.

the horses will probably be unloaded during the journey, chief of section collects the feed bags belonging to his ion and turns them over to the stable sergeant, who makes iemorandum thereof. The grain bags are retained by the , who pack them with their saddles. The stable sergeant that the feed bags, necessary grain measures, a few band- and disinfectants, and stable tools are placed in the center he forage car, so as to be readily accessible.

he men take their slickers or overcoats, canteens, and haver- ts or saddle bags with them in the cars. Such arrangements made as will avoid the necessity for carrying these articles le at work and insure their being properly guarded and llable at the proper time.

159. So far as practicable all stores, forage, etc., should be he loading places before the train arrives (1748). Simi- y, each battery complete with all its matériel, animals, and onnel, except those men needed as guards over stores, should ve, so that the horses may be unharnessed and harness and iages placed convenient to the loading places before its n is spotted. It is desirable that the detail of such guards ire necessary before the arrival of the battery should be e from the cannoneers.

160. As soon as the battery has been unhitched the team uld be taken to the vicinity of the place at which the har- is to be loaded and there unharnessed. Each two pairs held by a cannoneer designated by the chief of section.

The remaining cannoneers assist the drivers in unharnessing and securing the harness.

When harness sacks are available the harness of each pair is packed in its sack, plainly marked (**409**). The horse equipments of officers and individually mounted men are placed in sacks or, if sacks are not available, wrapped in saddle blankets, plainly tagged. The horse equipments of officers are placed in the baggage car or, if a separate car is provided, in the car with their mounts. The horse equipments of individually mounted men are placed in the car with the harness.

1761. If harness sacks are not available, grain sacks may be used (**409**), or a paulin may be used to wrap all the harness pertaining to each carriage. The following method is convenient:

In the description north, south, east, and west refer to the sides of the paulin, as it lies on the ground, and are used merely for convenience, any particular side being designated as such.

Spread paulin on the ground, marks down. Place near side collar in center of paulin, bearing surfaces up, top north. Place wheel and lead collars on right and left of it, bearing surfaces up, tops south. Place saddle blanket of each horse on its collar, folded as when placed on harness peg. Place off collars on blankets, bearing surfaces up, tops in a direction opposite to those of near collars. Place blankets on collars. Place saddles on blankets, north and south, attachments folded under seats. Place off saddles upside down across near saddles, attachments underneath. Lay bridles between bars of saddles. Fold near and swing traces and lay them on the pile, lengthwise. Place the neck yoke on the ends of the blankets on one side of the pile. Fold wheel traces once and place on the other side of the pile.

Fold east and west sides of paulin over ends of pile. Fold north and south sides. Pass a picket rope around center of bundle, turn it once on itself, then take a turn around each end of the bundle with the free ends; cross these ends over ends of bundle, roll the bundle over, pass the ends of the

the other side of the bundle, taking a turn around the
ıg parts of the rope in passing, and engage the hook in
ing. Or, lay the picket rope on the ground, its center
ng a U, the sides of which are about 2 feet apart.
d the paulin over this and proceed as before. After the
e is folded, the binding is somewhat simpler than in the
case, but the bundle will be secured by only two turns
ıd of three and there will be an excess of rope. Tying a
in such heavy rope is difficult.

e harness having been secured in bundles the cannoneers
them convenient to the loading place. In carrying the
le care must be taken to hold them clear of the ground.

762. The drivers take the horses to a designated place and
e them. If the stables or permanent picket lines are
able they should be secured there and left under the
ge of two drivers detailed as guards. Otherwise the
es of each section should be formed in a circle, the halter
rope of each horse being securely tied to the halter of
horse next to him. In this case each chief of section
ils a driver to remain with the horses of his section as
rd. In either case the horses are given a feed of hay,
ch should have been withheld from them for some hours
re. Whenever practicable they should be watered about
hour before they are loaded.

763. The horses having been unhitched and secured, the
tery falls in, each man carrying his haversack or saddle
s, canteen, and slicker. These articles are deposited on
ground and a guard placed over them. The necessary
ails are made and the loading is started as soon as the
s have been inspected and turned over to the organiza-
n.

764. Each train commander should detail an officer to
ompany the quartermaster in the latter's inspection of the
rs, made after the train is made up and before it is turned
er to the troops for loading.

Passenger cars must be clean, fully supplied with water and ice, and sufficiently lighted and heated. Common defects are lack of water, ice, and illumination.

Stock cars must be inspected with special care to see that they are in good order throughout. Common defects are loose boards, rotten flooring, broken fixtures, protruding nails, and filthy condition. These are sources of danger and discomfort to the animals and of loss to the Government. Unsuitable cars should be rejected. In time of peace the commanding officer should not hesitate to suspend the movement until proper cars have been provided. In time of war it is usually necessary to be content with what can be obtained. Such repairs as are practicable should be made, and a report forwarded setting forth the conditions.

Baggage, box, and flat cars are usually in serviceable condition, but should nevertheless be thoroughly inspected.

1765. As soon as the cars have been accepted they are prepared for loading. The officer detailed to load the horses, accompanied by the stable sergeant and one or more of the mechanics, makes a detailed inspection of the stock cars. All projecting nail points are bent and splinters are removed. The breast bars on the doorways opposite the loading platform are examined, put in place, and the doors themselves secured fastened. Such repairs as may be necessary are made with the material available. The cars should be clean and the floor covered with at least 2½ inches of sand or sawdust. In permanent garrisons material for this purpose should be kept on hand.

The brake handles of the flat cars should be removed so that the carriages may be run from one car to another.

1766. Ordinarily a section can be usefully employed in loading a box or baggage car. A noncommissioned officer and about six men should be inside the car to stow the property. The remaining men pass in the packages.

In loading such cars care is taken to place the heaviest articles and those least needed at the bottom. Harness should not be placed in piles deeper than two packages. Individual

se equipments and the bundles of blanket rolls may be stored top of the harness.

767. The carriages of a battery on a war footing are conniently loaded in the following order: On the first car, the t section and one carriage of the fifth; on the second car, the ond section and one carriage of the fifth; on the third car, third section and one carriage of the sixth; on the fourth , the fourth section and one carriage of the sixth; on the h car, the seventh section and the battery wagon and forge; the sixth car, the eighth section and the store wagon.

n preparing to load, the carriages should be disposed ocniently for following the above sequence.

1768. Ordinarily no attempt is made to load more than one hicle car at a time. It will be convenient to run the last lim-s at least from an empty car to the one being loaded. Freently the length of the loading platform will be such that veral of the cars must be reached by running the carriages ross other cars.

1769. As a rule two sections may be advantageously used in ading the carriages. The two driver squads bring the carages in proper sequence to the loading platform convenient the cars. One gun squad runs the carriages from the platrm to the car being loaded; the remaining gun squad places e carriages in the proper position. If the platform is small d its approaches are difficult, additional men must assist the o driver squads.

1770. To load the first car when the carriages are run across her cars, proceed as follows:

The drivers run the carriages to the edge of the platform at a nvenient car in the following order: First caisson, fifth sec-n; caisson, first section; gun, first caisson, fifth section. Each nber, first caisson; limber, first caisson, fifth section. Each these is placed with its trail or pole pointing squarely across e car on which it is first to be placed. The gun squad designated to run the carriages to the car being loaded takes the rriages as they are placed by the drivers. Each caisson and

the gun is successively drawn onto the car and its trail turne away from the direction in which it is thereafter to be ru Each is then pushed to the car being loaded, where it is droppe The pole of each limber is turned in the direction in which i is to be run. Each limber is pulled to the car next the one b ing loaded. The gun squad designated to place the carriag on the car being loaded takes them as they are delivered an places them in position. The first caisson delivered is place with the trail pointing toward the middle of the car, the wheel resting about 3 feet from the front end of the car. The nex caisson is placed in a similar position, tires squarely agains those of the first. The gun carriage is placed with its trail i the same direction as those of the caissons, the wheels so place that no part of the gun or carriage touches the caisson. Th limbers are put on in the order in which they are delivered the poles pointing in a direction opposite to the trails. The pole of the first limber to be loaded is placed under the right rail seat of the gun, the wheels so that no part of the limber wi touch the gun or carriage. Each of the other limbers is place tire to tire with the limber next before it.

Care is taken that all the wheels are in line so that ful length timbers may be used in checking the wheels agains lateral movements.

The other cars are loaded in a similar manner, the store wagon or the battery wagon being placed as prescribed for a gun carriage. In loading the last car it may be necessary, when short cars are furnished, to take out the pole of the last limber The pole should be replaced as soon as the limber is in place

1771. The vehicles are secured with 2 by 4 inch timbers a follows:

Pieces nailed to the floor of the car on both sides of each wheel prevent transverse motion. These should be as long a practicable.

Pieces in front and rear of each wheel prevent longitudina motion. These should be 7 feet long and are placed on an nailed to the pieces which lie alongside the wheels.

es placed over the lowest part of the felloes and secured
timbers which lie alongside the wheels prevent vertical
. These should be 7 feet long. Small blocks nailed to
le timbers fore and aft of these crosspieces assist in
g them; 7-inch spikes should be used for this purpose.
limber poles and the caisson trails may be secured by
; blocks on both sides of each and one across the top near
d. The trail of each piece should be secured by nailing
e on each side of it, one in prolongation of its axis and
ross the top near the end. All of these blocks should be
long and of 2 by 4 inch timber. When time is of im-
ce the blocking of the poles and trails may be omitted
it great danger. A spare piece of 2 by 4 inch timber
be secured to each car so that material for repairs may
ilable en route.

2. The necessary timber and nails are furnished by the
rmaster. The most economical length of timber is 14 or
.

never possible the proper lengths for crosspieces, blocks,
ould be cut before the time for loading.

material necessary for each battery is as follows:
thousand eight hundred linear feet of 2 by 4 inch timber.
nty-five pounds 20-penny (4-inch) nails.
pounds 7-inch nails.
each three field wagons or reel carts 250 feet of timber
pounds of nails should be allowed.

3. As each flat car is loaded the mechanics nail the secur-
ubers in place. A gun squad should be detailed to bring
ubers and put them in position for nailing.

he field, when sufficient lumber can not be obtained,
must be improvised from all available material. In such
additional security is obtained by lashing together the
s that are placed tire to tire.

4. When ample time is available it may be desirable to
e such articles as paulins, lanterns, etc., from the carriages
rry them properly packed in a box car with other stores.

1775. The horses should not be loaded until the loading of all carriages and stores has been completed. Whenever possible the loading pens and chutes to be found at railroad stations should be used. In any case especial care must be taken that the horses have secure footing in passing into the car, and that side rails are provided to prevent their stepping between the car and the platform.

For each car being loaded four selected noncommissioned officers, a mechanic, and a gun squad should be detailed. Two of the noncommissioned officers work inside the car. The remaining noncommissioned officers work at the door of the car. Two of the members of the gun squad collect the halter ropes and see that they are turned over to the stable sergeant at the forage car. The remaining cannoneers assist the noncommissioned officers at the doors. When chutes are available all these men except the noncommissioned officers should remain outside the runways until they are needed. When pens and chutes are available the horses are penned by carload lots. A noncommissioned officer and a driver squad are assigned to work in each loading pen. The remaining drivers bring the horses from the holding pens and place a new carload lot in the loading pen as soon as the preceding lot has been loaded. As the horses arrive the drivers in the loading pen remove the halter tie ropes and pass them to the cannoneers detailed to collect them. The gate to the runway is kept closed until the gangway is in place, the side gates closed against the gangway, and the noncommissioned officers in place. Everything being in order the gate is opened and one of the drivers leads a docile horse up the runway. The remaining drivers cause the horses to follow as closely as possible. This is accomplished without shouting or otherwise exciting the animals. Horses that bite back are slapped or gently struck across the rump with a tie rope. The noncommissioned officers inside the car place themselves near the door and keep the horses quiet by speaking to them. When the first horse arrives one of the noncommissioned officers takes him from the driver and leads him to one end

car. After this the noncommissioned officers confine themes to keeping the horses quiet and preventing them from ing the car. Trained horses are thus allowed to pack themes in the car. It is desirable that as many horses as practble be placed in each car not provided with separate stalls. 'ith horses not trained in loading each noncommissioned er may be assisted in the car by two men whose duty it is to l the last horse received in place across the car.

he car having been filled, the noncommissioned officers inside car first put up the breast bar and then leave the car. The gplank is swung back, the side gates slipped back, and the door closed. The mechanic fastens the door securely.

776. When loading pens are not available and the horses t be loaded from a platform similar methods are used except all the horses are led by drivers into the car. The halter tie s are taken off after entering the car and turned over to cannoneers collecting them as the drivers pass out. In ing the car the drivers must be careful to avoid interfering horses just entering.

'77. When permanent platforms are not available, platforms amps must be improvised.

)r loading the carriages such platforms or ramps are preferplaced at the end of the cars. For animals the ramp should 'ell supported, have strong sides, and the bottom provided cleats to give a secure footing. By taking advantage of ow cuts and using baled hay, platforms may be readily ovised.

ich time and labor may be saved by carrying material for)s ready prepared on the cars with the carriages.

78. It is not necessary to wait for an engine each time cars be spotted during loading or unloading. By uncoupling 'ars, and distributing 20 or more men along the sides of to be moved, two or more cars may readily be shifted. must be taken to have men ready to handle the brakes and 'e signals in such a way as will cause all the men to work her.

1779. The animals having been loaded the men fall in at the place where their equipments were left, secure them, and are marched to the coaches. The assignment of men to particular coaches should have been made beforehand so that the men may enter without delay.

So far as practicable sections are kept together. In each car the senior noncommissioned officer occupies a seat next the door at one end of the car and the next senior, except in the officers' car, a seat next the other door. These noncommissioned officers preserve order and see that no one leaves the car without authority.

The cooks are in the kitchen car or in the car next to the baggage car used as a kitchen. The first sergeant, stable sergeant, supply sergeant, battery clerk, and mechanics are in the car with the officers.

Before entering the train the battery commander cautions the men not to leave the cars without specific orders, that complaints are to be made to him and not to the train crew, and gives such other instructions as may be necessary.

The sleeping-car conductor, or the porters, and the train conductor should be informed as to the orders relative to the introduction of unauthorized articles on the train and requested to impart this information to their subordinates.

1780. The train conductor should be requested to notify the battery commander immediately before any halt of 10 minutes or longer is to occur. During such stops an officer, accompanied by the supply and stable sergeants, the chief mechanic and one or more mechanics inspects the stock and flat cars and makes any repairs which may be necessary and practicable.

When the duration of the stop is considerable sentinels should be posted over the flat cars, unless they have a permanent guard.

1781. The animals should be unloaded once each 24 hours for exercise, feeding, and watering.

When the journey is to exceed 24 hours suitable arrangements should be made with the railroad authorities for the stop for feeding. It is desirable that the place for unloading should be

ected several hours beforehand, so that proper notice may be en to the station agent and other railroad officials. In order avoid reloading the animals at night a station should be se- ted that will be reached at about noon.

1782. The necessary requirements for a suitable feeding sta- n are water and a platform or, preferably, chute for taking animals out of the cars.

Ample stock pens, dry footing, facilities for renewing the bed- g in the cars, etc., are also desirable.

1783. Before reaching the feeding station the senior non- mmissioned officer in each car details a cannoneer to remain the car as a guard, causes the drivers to get out their groom- kits and cautions the men that their remaining equipment, cept pistols, is to be left in the car.

Upon reaching the feeding station the men, except the mess geant, the cooks and guards, are notified to leave the cars d fall in at a designated place. Rolls having been called the ivers are formed separately from the cannoneers.

1784. Two gun squads are detailed to assist the stable ser- nt in preparing the forage. These men are at once marched the forage car. The stable sergeant, upon reaching the for- car, gives the halter tie ropes to one of the gunners who, isted by a cannoneer, takes them to the stock cars and dis- butes them as they are needed. These men are responsible collecting the tie ropes and turning them over to the stable geant when the horses are reloaded.

The stable sergeant causes the remaining men of his detail put one feed of oats in each feed bag and to distribute one d of hay at the feeding places.

The feed bags are not taken to the feeding places until the mals have been watered when all the cannoneers assist in distribution. No attempt is made to give the horses their feed bags.

1785. The supply sergeant, the chief mechanic, and all the hanics not engaged in unloading the animals proceed, as

soon as the rolls have been called, to the flat cars where the make such repairs as may be necessary. Having complete these repairs the mechanics begin on the stock cars as soon as the latter have been unloaded.

As soon as an officer is available, one is detailed to inspect this work, to cause any additional repairs that may be necessary to be made, and to superintend the resanding of the cars (178

1786. The drivers, the remaining gun squads, and the necessary mechanics are marched to the unloading place. Five selected noncommissioned officers, a gun squad and one mechanic are detailed for each place where a car is to be unloaded. These men remain at the same chute or platform until all of the cars there have been emptied. Before any car is unloaded sufficient drivers to provide one for each two horses are sent to join the above detail. Each of these drivers secures two halter tie ropes from the men distributing them. The remaining drivers and cannoneers are held in ranks until they are needed.

An officer should be in charge of the unloading of each car.

1787. Two of the noncommissioned officers of the above detail are assigned to work inside the car, the others working outside at the door. The cannoneers assist the latter noncommissioned officers and also assist the drivers in catching up the horses. The mechanic removes the fastenings and assists in opening the door.

The principal difficulty in unloading is in preventing the horses from leaving the car before the gangway, gates, or side rails, etc., are in place and in avoiding overcrowding in the doorway.

1788. As soon as the car is in place the door is opened enough to permit the noncommissioned officers who work inside to enter. These men at once enter, leaving the breast bar in place, and quiet the horses nearest the door by speaking to and caressing them. Everything being in readiness the door is completely opened and the gangway, gates, etc., put in position as quickly as possible.

a loading pen is available the drivers and cannoneers ;ned to the car go into the pen to catch the horses up after enter it. If no pen is available the drivers and cannoneers themselves up on either side of the door, each one taking ıimal in turn as he leaves the doorway. All men being in r places the noncommissioner officers inside the car re- e the breast bar, and every endeavor is made to make the ıes leave the car quietly and in single file.

789. The cannoneers assist the drivers in catching up the ıes. As soon as all the animals of the first lot have been ght up the pairs are formed in column and the drivers lead horses around at a slow walk. A noncommissioner officer uld be designated to lead the column of this first lot. As h succeeding car is unloaded and the horses caught up, the ers join the rear of the column.

790. If ample feeding lots are available a separate lot should assigned each separate car. In any case no attempt is de to separate the horses by sections, but effort is made to p together the horses that have been in the same car and to ıad them together. Drivers remain with the pairs which y catch up and do not attempt to find their own horses unless latter are with the same carload to which the driver is ıgned. In this case a driver may be allowed to take his own ses after they are tied up for grooming and feeding.

791. The object of walking the horses and of the subsequent ıoming is to remove the stiffness and swelling of the legs luced by the long standing in the cars. For this reason the ercise of the horses should be continued for 10 or 15 minutes ter the unloading of the last car has been completed.

792. Hay having been distributed and the exercising com- ted, the horses are properly secured and then groomed while y are eating hay. During the grooming particular atten- n is paid to cleaning and hand rubbing the legs thoroughly. kicks, cuts, and abrasions are reported to the stable sergeant, ıo visits all the horses at this time.

1793. During the grooming the cannoneers proceed to th stock cars and renew the sanding if material is available. Too for this purpose may frequently be had from the railroad stockyard authorities or they may be taken from the carriag Sometimes it may be necessary to detail a number of cannone to draw water for the animals.

1794. The grooming is continued until the animals must watered, which should be in time to allow them to eat th grain before it is necessary to begin reloading.

At the proper time the officer in charge of renewing the su causes the cannoneers to take the filled feed bags and to d tribute them after all the horses have been watered. He th details a gun squad to collect the feed bags and turn them re to the stable sergeant at the forage car after they have be removed from the horses.

1795. At least two hours should be allowed for unloadin feeding, and reloading.

In all loading and unloading particular care must be exercis to avoid any shouting or excitement on the part of the me these are the principal causes of excitement on the part of horses, which, in turn, is the source of most difficulties in ha dling the animals.

1796. Upon arrival at the detraining station complete a early information as to the facilities for unloading and oth conditions is essential to the orderly planning and conduc the detraining. For this purpose each train should be met as arrives by an officer or officers from preceding organizations

1797. The detraining should ordinarily be so conducted release the cars as rapidly as possible and thus avoid congest in the detraining station. Following this principle, the m take all of their equipment with them upon leaving the coach the stock cars are unloaded first, the flat cars next, and fin the baggage cars and the box cars.

1798. Upon arrival the noncommissioned officers cause men to take their equipments, but no one leaves the cars cept the officers and the first sergeant until ordered to do

e necessary plan for unloading having been made, the men are ered to leave the cars and fall in at a designated place. ls having been called, the mess sergeant and the cooks pro- l directly to the baggage car containing the kitchen equip- it and the rations. The remainder of the battery is marched a suitable place where the men may leave their equipment. e men having deposited their equipment, a guard is placed, necessary details are made, and the work of unloading an.

799. Whenever practicable, arrangements are made at once unloading the kitchen equipment and necessary rations for first meal and for transporting them to a suitable place. h cannoneers as are necessary are detailed to assist the mess eant and cooks in this work. The horses are unloaded as tofore described, but are arranged by sections as they are aded and are secured at once, care being exercised that they not tied to movable or flimsy structures. The feed bags not filled but hay is fed at once. Two or more cannoneers set to work to sort the feed bags out by sections, and later, n the horses are being harnessed, to turn them over to the fs of section.

iring the unloading of the horses the quartermaster ser- t, the mechanics not assisting at the stock cars, and one squad proceed to the flat cars and begin the removal of the ts preparatory to unloading. As the timbers are removed are taken to a suitable place and one man is left with as guard until they are finally disposed of.

00. The horses having been unloaded, secured, and given a of hay, work on unloading the carriages is begun. Usually t of the men may be usefully employed in unloading the ge and box cars simultaneously with the unloading of the ages.

01. As the carriages are unloaded they are run to a suit- place and arranged in proper order in park or column nient for hitching in. A guard is posted over the park n as the first carriage is placed.

1802. In unloading the harness it is arranged by sections so as to give ample room for harnessing.

1803. Ordinarily the battery should harness, hitch in, and clear the vicinity as soon as the horses, carriages, and harness have been unloaded. When the box cars have not been completely unloaded all cannoneers not needed to hold horses during the harnessing may be left at work unloading.

1804. While the foregoing methods of loading and unloading outline the principles which should be followed, the details of the plan adopted must be varied to conform to the conditions of each particular case. For example, the facilities for watering may be so limited that it will be necessary to water throughout the stop; or the period of travel may have been so great or the temperature so high that, to prevent suffering, watering should commence immediately after unloading.

The first essential is a definite plan, conformable to existing conditions, and its methodical execution without excitement or undue haste.

SECTION II.—BY WATER.

1805. At sea, transportation of troops is effected by the Army Transport Service.

The necessary preliminaries before embarking, the routine details on board transports, and methods of disembarking are prescribed in the Army Transport Service Regulations, a copy of which should be secured by the commander of each organization designated for over-sea service.

1806. For over-sea transportation Artillery carriages should generally be knocked down; wheels removed and guns dismounted. Fuse setters and all implements, equipments, and wheel fastenings should be removed from the carriages and boxed. Harness and horse equipments, except such as are needed for use during the trip, will be boxed and marked to show the section to which they belong. For expeditions into the theater of operations it may be desirable not to dismount the guns or remove the wheels.

In time of peace, and when conditions permit in time of war, e ammunition chests will be emptied and all loose ammunition rned in, Artillery ammunition being embarked in original ıckages only.

The men retain in their possession their personal equipments. Battery wagons, store wagons, reel carts, and signal chests ıould be fully equipped before embarking and should be stored here they will be accessible. For expeditions into the theater operations it is obligatory that all of the personnel, matériel, ıd ammunition of a battery be carried on the same vessel.

1807. Horses are led aboard if docking facilities permit, otherise they are lightered to the transport and hoisted aboard, if ecessary, by means of slings or other appliances, with which ıe transport should be provided.

Horses should not be watered or fed for several hours before mbarkation.

If it is necessary to disembark at a point where there are no harves, suitable boats or lighters must be provided by the ansport service.

In calm water horses may be lowered into the water or driven verboard from low ports and required to swin ashore. In such ıse the first horses overboard may be led from small boats.

1808. It is the duty of the transport service to provide forage ır animals while on board and for proper arrangements for ıabling them.

Special methods for the care and handling of animals on hipboard are prescribed in the Army Transport Service Regutions.

CHAPTER XIII.—FIELD AND SURPLUS KITS.

1809. The field kit consists of the arms, personal and horse ıuipments and clothing, additional to that worn on the person, ıquired by and prescribed for the soldier in the field.

The articles comprising the kit vary with the duties of the ıen and are furnished by the Ordnance Department, the Quarrmaster Corps, and the Medical Department.

1810. The field kit for individually mounted men consists of and is carried as shown below.

Ordnance Property.

(A) PERSONAL EQUIPMENT.

Articles.		Where carried.
1 can, bacon		Near saddle pocket.
1 canteen		Near cantle ring.
1 canteen cover		On canteen.
1 cup	Mess kit	On canteen, under cover.
1 fork		Near saddle pocket.
1 knife		Near saddle pocket.
1 spoon		Near saddle pocket.
1 meat can		Near saddle pocket.
1 pistol, belt, holster, magazine pockets, 2 extra magazines, 21 cartridges		On person, belt outside all clothing, pistol on right hip, first-aid packet on left of and toward front of belt, magazine pocket in front of first-aid packet.
1 pouch for first-aid packet		
1 spurs, pair		On person, buckles outside.
1 spur straps, pair		

(B) HORSE EQUIPMENT.

1 bridle		On horse.
1 halter headstall		On horse.
1 halter tie rope		On halter, free end secured in near pommel ring.
1 link		On bridle, free end snapped up.
1 saddle blanket		On horse.
1 saddle		On horse.
1 saddlebags, pair		On saddle, the saddlebag straps passed through the cinch rings and drawn tight before fastening.
1 surcingle		Over saddle, buckled on near side.
1 currycomb	grooming kit	Off saddle pocket.
1 horse brush		
1 feed bag		On saddle.
1 grain bag		In feed bag.

Quartermaster Property.

(C) EQUIPMENT.

entification tag	Slung around neck by tape.
ns, tent, shelter ole, tent, shelter	In blanket roll.
ent, shelter, half, mounted	Around and forming part of blanket roll.

(D) CLOTHING COMPONENT.

lanket	In blanket roll.
licker	Rolled and strapped to pommel of saddle.
owel	Off saddle pocket, outside canvas lining.
omb oap, cake oothbrush	Wrapped in towel.
lrawers, pair stockings, pairs ndershirt	In blanket roll.

(E) RATIONS.

eserve rations, each consisting of—	
12 ounces bacon	In bacon can.
16 ounces hard bread	Divided between saddle pockets.
1.12 ounces coffee, R. & G	In coffee bag of saddlebags, in near pocket.
2.4 ounces sugar	In sugar bag of saddlebags, in near pocket.
0.16 ounce salt	In salt bag of saddlebags, in near pocket.

(F) FORAGE.

feed, 4 pounds of grain	In grain bag.

(G) MEDICAL PROPERTY.

first-aid packet	In pouch on belt.

1811. The sweater and the overcoat form part of the equipment to be carried with the men in the field only when climatic conditions require them. When they are not ordered carried they are made up in bundles, secured and marked so that they may be forwarded whenever necessary.

1812. When the sweater is carried and is not worn on the person it is placed in the blanket roll. When the overcoat is carried and is not worn it is rolled and strapped on the pommel of the saddle.

1813. To roll the overcoat or slicker.—Spread the overcoat on the ground, inside down, skirt buttoned throughout, sleeves parallel to the middle seam, collar turned over on the shoulders.

Turn the tails of the coat under about 9 inches, the folded edge perpendicular to the back seam. Fold over the sides to form a rectangle not more than 34 inches across, according to the size of the coat. Roll tightly from the collar with the hands and knees, and bring over the whole roll that part of the skirt which was turned under, thus binding the roll.

The slicker is rolled in a similar manner.

1814. To make the blanket roll for mounted men.—Spread the shelter half (model 1904) on the ground, roll straps underneath and fold over the triangular part on the rectangular part. Turn under the roll strap edge of the shelter half so that the width of the fold will be 8 inches. Fold the blanket once across the longer edges and lay the blanket on the shelter half, folded edge within 1 inch of the roll strap edge of the shelter half. Fold the sides of the blanket and of the shelter half inward, width of folds about 11 inches. The shelter tent pole and pins are laid on the blanket at the edge farthest from the roll strap edge, pole on one side of the center line, pins on the other, so as to allow the roll when completed to bend at the center. Place the underclothing on the blanket. If the sweater is to go in the roll spread it smoothly over the blanket.

Roll tightly toward the roll strap edge, using hands and knees, and bring over the entire roll the part of the shelter half which

turned under, thus binding the roll. Buckle the two avail- roll straps about the roll, passing them around twice. The thus formed should be about 44 inches long.

815. To pack the feed bag for individually mounted men.— grain is placed in the grain sack and equally divided between two halves. The elongated grain sack is then placed inside feed bag and the whole lashed tightly to the blanket roll by web straps at each end of the feed bag, so that the open part the feed bag is closed against the blanket roll. If empty, the d bag, with grain sack inclosed and all web straps buried in bag, is lashed to the blanket roll by the coat straps.

To pack the blanket roll with the attached feed bag, three it straps are used, one to fasten the middle of the roll to the idle of the cantle of the saddle, and one at each end to fasten end of the roll to the saddlebag strap ring. The blanket roll placed on the cantle so that the feed bag will be uppermost. e coat straps are passed twice around the roll and buckled.

816. The equipment of each driver is the same as for indi- ually mounted men with the exception of horse equipment and in.

The driver's horse equipment consists of 1 horse brush, 1 rycomb, 2 feed bags, 2 grain bags, and 2 surcingles. Each ver carries a feed of grain for each horse. Halters, saddle- s, saddle blankets, etc., are included in the harness.

817. The driver's canteen is snapped in the near pommel g of the off saddle. His saddlebags, blanket roll, feed bags, cker, etc., are likewise packed on the off saddle. After attach- his slicker the driver turns the top of the roll over the mmel down into the saddle so as to avoid any interference th the rein roller on the off saddle.

818. To pack the driver's blanket roll and feed bags.—The in is placed in the grain sacks and each sack placed in its d bag. The two feed bags are tied securely together at their en ends, using the "nose and head" web straps, the two bags ng tied as closely as possible to prevent the lower ends chafing

against the traces. The two feed bags are then suspe
across the seat of the saddle of the off horse and lashed in p
by the 60-inch coat straps on each side, as follows:

Pass the coat strap under the rear quarter strap and take
turn around the nose bag, if necessary punching a "throat" i
the bag near the lower end to prevent the coat strap slipp
The blanket roll being lashed to the center of the cantle, be
the free end of the roll forward so as to bind over the feed
and take two turns around the end of the blanket roll with
coat strap. Then pass the free end of this strap over the str
thus in place and buckle tightly. Do the same on the off
side.

If more than one feed is to be carried, place the grain for
first feed in the closed end of the feed bag and lash the feed
tightly with the rawhide thong. Put the remainder of the gr
in the grain sack, and place the grain sack in the feed ba
secure the two feed bags to the off saddle as above.

The surcingles are carried one on each horse, buckled
the saddle.

With the exceptions noted, all articles of the driver's equi
ment are packed and carried in a manner similar to that pr
scribed for individually mounted men.

1819. In addition to the kits above prescribed, each corpo
is provided with a housewife which he will carry in his haver
sack or off saddle pocket.

The members of the special details and of the headquarter
company are provided with various equipment which they ca
on their persons. The field glasses will be carried on the ri
side, the flag kit on the back, the strap in each case pass
over the left shoulder.

An agent while on duty as such will wear on the right fo
arm a red brassard. Brassards are furnished by the Quarte
master Corps.

1820. The field kit for cannoneers and all men not mounte
including Nos. 8 trained as spare drivers, consists of and
carried as shown below:

Ordnance Property.

(A) PERSONAL EQUIPMENT.

Articles.	Where carried.
can, bacon can, condiment	In haversack.
canteen	On right rear of pistol belt.
canteen cover	On canteen.
cup	On canteen under cover.
fork	In haversack.
knife	In haversack.
spoon	In haversack.
meat can	In haversack.
Mess kit	
pistol, belt, holster, magazine pocket, 2 extra magazines, 21 cartridges.	On person, belt outside all clothing on right hip, first-aid packet on left of and toward front of belt, magazine pocket in front of first-aid packet.
pouch for first-aid packet.	
haversack	On person.

Quartermaster Property.

(C) EQUIPMENT.

identification tag	Slung around neck by tape.
pins, tent, shelter pole, tent, shelter	In blanket roll.
tent, shelter, half mounted	Around and forming part of the blanket roll.
blanket	In blanket roll.
slicker	Folded and placed between folds of one of paulins of carriage on which soldier rides.
towel	In haversack.
comb soap, cake toothbrush	Wrapped in towel.
drawers, pair stockings, pairs undershirt	In blanket roll.

(B) RATIONS.

2 reserve rations, each consisting of—

12 ounces bacon	In bacon can.
16 ounces hard bread	In haversack.
1.12 ounces coffee, R. & G. 2.4 ounces sugar 0.16 ounce salt	In condiment can.

(G) MEDICAL PROPERTY.

1 first-aid packet—In pouch on belt.

1821. The remarks made with reference to the sweater and the overcoat in the case of mounted men (1811) apply to cannoneers except that when the overcoat is carried, and not worn by the cannoneer, it is folded and placed between the ... of a paulin on a carriage of the section to which the cannoneer is assigned.

1822. When the old model haversack and canteen are issued the personal equipment of men not mounted is increased by two canteen haversack straps. Such haversacks are slung from the right shoulder to the left side. The canteen is slung from the left shoulder to the right side, the strap passing over that of the haversack. Both ends of the haversack strap and the rear end of the canteen strap pass under the pistol belt.

When the old model canteen and cup are issued the cup is carried in the near saddle pocket by mounted men and in the haversack by men not mounted.

1823. To make the blanket roll for men not mounted.—Lay the shelter half on the ground and fold over the triangular part.

Hold the blanket up by two corners, the shorter edges vertical; bring the two corners together, thus folding the blanket in the middle; take the folded corner between the thumb and fore finger of the right hand, thumb pointing to the left; slip the left hand down the folded edge two-thirds of its length and seize it with the thumb and second finger; raise the hands to the height of the shoulder, the blanket extending between them; bring the

nds together, the double fold falling outward; pass the folded rner from the right hand into the left hand, between the umb and forefinger; slip the second finger of the right hand tween the folds, seize the double folded corner; turn the left lisengaged) corner in, and seize it with the thumb and fore- ger of the right hand, the second finger of the right hand retching and evening the folds. The blanket is now folded six thicknesses.

Lay the folded blanket on the shelter half so that one of its orter sides will be about 8 inches from the edge of the shelter alf farthest from the triangular part. Place the underclothing the blanket. If the sweater is to go in the roll fold it and ace it on the blanket with the folded edge of the sweater even th that of the folded edge of the blanket. Across the other ort side of the blanket place the shelter tent pole and pins.

Fold over the sides and ends of the shelter half which lie out- de of the blanket, causing the ropes and straps to be included thin the folds.

Commencing at the end where the pole and pins are placed ll the pack, using the hands and knees to insure the roll ing made as tight as possible. Just before the roll is com- eted open out slightly with the hands the pocket formed by e 8-inch fold of the shelter half, and then draw the pocket er the roll, thus binding it. Care should be taken to draw e canvas over the ends of the roll so as to prevent rain and ust from entering the inner portion of the roll. The roll thus rmed should be about 22 inches long.

The roll is secured to the limber chest of the carriage to which e soldier is assigned, by means of the straps provided for the rpose. The rolls carried on any one limber chest are evenly sposed on either side of the door lock.

1824. It is frequently desirable, especially in a strong wind, r the men to work in pairs in making their rolls.

1825. The surplus kit contains articles of clothing necessary camps of several weeks' duration and to permit the replace- ent of clothing worn out in active operations. For these pur-

poses the surplus kits are forwarded to troops when serving instruction, maneuver, mobilization, and concentration cam or when in active service temporary suspensions of operation, other conditions, permit the troops to refit. In certain *cases* time of peace the surplus kits may, when transportation is ava able, accompany the troops on the march.

1826. The surplus kit of each man consists of—

1 breeches, pair.	2 stockings, pairs.
1 drawers, pair.	1 shoe laces, extra pair.
1 shirt, olive drab.	1 undershirt.
1 shoes, russet leather, pair.	

1827. The kit of each man will be packed as follows:

Stockings, rolled tightly, one pair in the toe of each shoe; shoe placed together, heels at opposite ends, soles outward, wrapp tightly in underwear, and bundle securely tied around the midd by the extra pair of shoe laces, each bundle tagged with th battery number of the owner.

The breeches and olive-drab shirt are not rolled (**1829**).

1828. Surplus kit bags at the rate of one to each eight me or major fraction thereof are issued to organizations by th Quartermaster Corps.

All bags will be uniformly marked in the center of the fro cover flap. Those pertaining to a battery are marked with th battery stencil and with the designation of the squad to whic the bag pertains; for example, the bag belonging to the *drivers* of the first section will be marked below the stencil, **FIRST SEC.**, and below that, **DRIVERS.**

Bags pertaining to the headquarters company and to the sup ply company are marked with the headquarters company an the supply company stencil and the serial number of the bag

1829. The shoes, underwear, etc., of each squad are packe in the surplus kit bag in two layers of four kits each; the breeche and olive-drab shirts are neatly folded and packed on the top an sides of the layers.

1830. In garrison, the surplus kit articles are not required t be kept habitually packed and stored, or kept apart from th

: of a soldier's belongings. The soldier should, however, have clothing component of both the field and surplus kits.
rganization commanders will require the surplus kits to be pared and packed from time to time as a matter of instruc-
ı.

CHAPTER XIV—CAMPING.

831. The forms and dimensions of camps and the character l amount of tentage or other shelter used vary greatly with conditions.
n permanent camp or when operations partake of the nature a siege, every effort must be made to provide adequate elter for both men and animals.
Animals constantly exposed to the sun in hot weather and to l winds, rain, or snow in winter lose condition very rapidly.
832. The general arrangement of semipermanent camps and requirements which camp sites should fulfill are given in ld Service Regulations. Whenever practicable the width of camp therein shown should be somewhat extended and pro-ion should be made for lines on picket posts for the horses.
The picket line should be well drained by cutting ditches out 12 feet on either side of the line and throwing the earth the center. Whenever practicable the ground should be cov-d with broken stone, sand, or cinders. Particular care must taken to provide dry footing not only on the picket line but ound the watering places in permanent or semipermanent mps.
833. Suitable tents or other shelter must be provided for rkshops for mechanics and for kitchens. Condemned canvas l be utilized for these purposes in camps of a duration too rt to justify suitable buildings.
When the camp is reached by rail the timbers used in securing carriages on the cars are, if carefully removed, very con-ient for such purposes.

The Selection of Camp Sites in the Field.

1884. In campaign, tactical necessity may leave little choi in the selection of camp sites, but under any conditions t requirements of sanitation should be given every considera consistent with the tactical situation.

1885. Great care should be exercised in selecting sites. general the following principles govern:

The site should be convenient to an abundant supply of pu water.

Good roads should lead to the camp. Interior communicati throughout the camp should be easy. A camp near a ma road is undesirable on account of dust and noise.

Wood, grass, forage, and supplies should be at hand or ea obtainable.

The ground should accommodate the command with crowding and without compelling the troops of one unit to p through the camp of another.

The site should be sufficiently high and rolling to drain storm water readily, and, if the season be hot, to face the bree In cold weather it should preferably have a southern exp sure, with woods to break the prevailing winds. In war weather an eastern exposure, with the site moderately shad by trees, is desirable.

The site should be dry. For this reason porous soil, cover with stout turf and underlaid by a sandy or gravelly subs is best. A site on clay soil, or where the ground water a proaches the surface, is damp and unhealthful.

Alluvial soils, marshy ground, and ground near the base hills or near thick woods or dense vegetation are undesirab as camp sites on account of dampness. Ravines and depre sions are likely to be unduly warm and to have insufficient undesirable air currents.

Proximity to marshes or stagnant water is undesirable account of the dampness and mosquitoes and the disea

...ie latter transmit. The high banks of lakes or large
often make desirable camp sites.
eds of streams should be avoided; they are subject to
freshet.
The occupation of old camp sites is dangerous, since
:e often permeated by elements of disease which persist
siderable periods. Camp sites must be changed promptly
:here is evidence of soil pollution or when epidemic
threatens, but the need for frequent changes on this
t may be a reflection on the sanitary administration of
mp.
ange of camp site is often desirable in order to secure a
: of surroundings and to abandon areas which have be-
lusty and cut up.

7. Under service conditions camp sites that will permit
ıcampment of regiments and brigades will often be un-
ble and regularity must be sacrificed.

8. In large commands the halt order should assign camp
to the next smaller commands, and the commanders of
atter should locate their respective commands to the best
ntage on the area assigned them.

39. Each battery ordinarily parks in line. The shelter
of the men are in two lines, facing each other, with a
t of 10 yards, the front line being about 10 yards in rear of
line of caissons. The tents may also be pitched facing a
s (1856).

340. Whenever practicable the intervals between sections in
park should not be reduced. A minimum of 40 yards by
yards is thus necessary for the shelter-tent camp and park.
en the available ground is more restricted or when the
ıther is good shelter tents need not be pitched, the men
ltering themselves under the paulins covering the carriages
harness.

Water Supply.

341. Immediately on making camp a guard should be placed
:r the water supply. If the water be obtained from a stream,

places should be designated, beginning upstream, (1) for drinking and cooking, (2) for watering animals, (3) for bathing and washing clothing.

If the stream be small, the water supply may be increased by building a dam. Small springs may be dug out and each lined with a gabion, or a barrel or box with both ends removed or with stones, the space between the lining and the earth being filled with puddled clay. A rim of clay should be built to keep out surface drainage. The same method may be used near swamps, streams, or lakes to increase or clarify the water supply.

1842. Water that is not known to be pure should be boiled 20 minutes; it should then be cooled and aerated by being poured repeatedly from one clean container to another. It may be purified by approved apparatus supplied for the purpose.

1843. Arrangements should be made for men to draw water from the authorized receptacles by means of a faucet. The dipping of water from the receptacles or the use of a common drinking cup should be prohibited.

1844. On the march, including camps, the daily requirements of water may be estimated at 6 gallons per man or 10 gallons per horse. In permanent or semipermanent camps the supply should be sufficient to provide from 25 to 30 gallons per man and 15 gallons per horse per day. This supply should be properly piped and delivered at convenient places in each organization camp.

Kitchen.

1845. Camp kettles are hung on irons or on a support consisting of a green pole lying in the crotches of two upright posts of the same character.

A narrow trench for the fire, about 1 foot deep under the pole, protects the fire from the wind and saves fuel. A still greater economy of fuel can be effected by digging a similar trench in the direction of the wind and slightly narrower than

ıe diameter of the kettles. The kettles are then placed on the ench and the space over it and between the kettles filled in ith stones, clay, etc., leaving the flue running beneath the ettles. The draft can be improved by building a chimney of ones, clay, etc., at the leeward end of the flue.

Four such trenches radiating from a common central chimney ill give one flue for use whatever may be the direction of the ind.

A slight slope in the flue, from the chimney down, provides or drainage and improves the draft.

1846. The lack of portable ovens can be met by ovens conructed of stone and covered with earth to retain the heat. If stone is available, an empty barrel, with one head out, is laid ı its side and covered with wet clay to a depth of 6 or more ches, and then with a layer of dry earth equally thick. A ıe is constructed with clay above the closed end of the barrel, hich is then burned out with a hot fire. This leaves a baked ay covering for the oven.

A recess can be similarly constructed with boards or even ushwood, supported on a horizontal pole resting on upright sts, covered and burnt out as in the case of the barrel.

When clay banks are available, an oven may be excavated erein and used at once.

To bake in such ovens, first heat them, and then close flues ıd ends.

1847. Food must be protected from flies, dust, and sun. *ıcilities* must be provided for cleaning and scalding the mess uipment of the men. Kitchens and the ground around them ust be kept scrupulously clean.

1848. Solid refuse should be promptly burned, either in the tchen fire or in an improvised crematory.

1849. In temporary camps, if the soil is porous, liquid refuse om the kitchens may be strained through sacking into seepage s dug near the kitchen. Boards or poles, covered with brush grass and a layer of earth may be used to prevent the access

of flies. The strainer should also be protected from flies. Pits of this kind in clay soil will not operate successfully. All pits should be filled with earth when the camp is abandoned.

Disposal of Excreta.

1850. Immediately on arriving in camp sinks should be dug. This is a matter of fundamental sanitary importance, since the most serious epidemics of camp diseases are spread from human excreta.

One sink is usually provided for each battery and one for the officers of each battalion. Those for the men are invariably located on the side of camp opposite the kitchens. All sinks should be so placed that they can not pollute the water supply or camp site as a result of drainage or overflow. To insure this, their localities and their distance from camp may be varied.

1851. When camp is made for a single night, shallow trenches 12 inches deep and 15 to 18 inches wide, which the men may straddle, will suffice.

In camps of longer duration, and when it is not possible to provide latrine boxes, as for permanent camps, deeper trenches should be dug. These may be used as straddle trenches or a seat and back rest improvised from poles or other available material. They should be screened by brush, condemned canvas or other material. When open trenches are used, special care must be taken to insure that all excreta is coverel with earth, lime, or ashes as soon as it is deposited.

1852. In permanent or semipermanent camps special sanitary facilities for the disposal or disinfection of excreta will ordinarily be provided. When trenches are used in such camps they should be at least 6 feet deep and 12 feet long and not more than 2 feet wide. Seats are walled to the ground and provided with lids to keep flies from reaching the deposits. urinal troughs discharging into the trenches are provided. Each day the latrine boxes are thoroughly cleaned, outside by scrubbing and inside by applying when necessary a coat of crude

il or whitewash. The pit is burned out daily with approxiately 1 gallon of crude oil and 15 pounds straw. When filled o within 2 feet of the surface, such latrines are discarded, illed with earth, and their position marked.

In permanent camps urine tubs should be placed in the batery streets at nightfall; they are emptied after reveille. Their ocation should be plainly marked and thoroughly and frequently disinfected.

Daily Routine.

1853. In camps of some duration guard and other duties fol- ow closely the custom in garrison.

The camp is policed daily after breakfast and all refuse urned. Tent walls are raised immediately after breakfast and ae bedding and clothing aired daily, weather permitting.

1854. When troops bivouac for the night the necessity for xtensive sanitary precautions is not great; however, shallow ink trenches are dug to prevent general pollution of the vicinty. If the cooking be collective, shallow kitchen sinks should e dug. If the cooking be individual, the men should be reuired to build their fires on the leeward flank of the camp or ivouac.

Before marching the ground should be thoroughly policed, ll refuse burned or buried, all trenches filled in, and fires xtinguished.

Security.

1855. In campaign the general security of the camp is usully provided by outposts and guards from the other arms. he Artillery provides guards for its parks and picket lines nd for such other places within its camps as may be necessary. he guard should ordinarily be sufficient to furnish for each icket line a double sentinel from the organization to which he line pertains. The guard is, when practicable, mounted by attalion or regiment, the necessary officers and noncommis-

sioned officers being detailed by roster. The necessary sentinels for stores, etc., are also detailed by battalion or regimental roster. Except in permanent or semipermanent camps all members of guards are sent to join their organizations at reveille. If prisoners are to be guarded during the march they are either turned over to the organization commander or are marched with and guarded by the battery to which the officer of the day belongs.

Tent Pitching—Shelter Tents.

1856. When shelter tents are to be pitched the first sergeant after the horses have been unharnessed, properly secured and cared for, and the guard having been sent to its post, gives the command: **In two lines** (or **In column facing to the right (left)**) **form for shelter tents.** The men, carrying their blanket rolls, saddlebags, canteens, and haversacks, proceed to the rear of the rear carriage of their sections. Each chief of section causes his section to fall in in column of squads, the driver squad in front, with a distance of about 10 yards between the squads. The squads of each section face the park if the command be **In two lines.** All the squads face in the designated direction if the command be **In column facing to the right** (left). In either case 10 yards open space is left in rear of the rear line of carriages.

1857. Each chief of section arranges for pairing odd men in his squads as far as practicable. If, after this has been done, any man in the section, including the chief of section, remains unpaired the first sergeant is notified. Having arranged pairs between the men left over in the several sections the first sergeant reports the battery formed, and with the guidon, with whom the sergeant pitches, takes his place to the right of the leading squad of the first section. The first sergeant having reported, the officer in charge causes the battery to take intervals as prescribed in The Squad. The men of each squad take

rvals, but no attempt is made to close the squads to the
it or left. As each man faces to the front he places his
ıket roll and other equipment on the ground.

858. The officer aligns the men and commands: **Pitch tents.**
men open their blanket rolls and take out the shelter half,
s and pins; the front man places one pin in the ground at
point where his right heel, kept in position until this time,
planted. Each then spreads his shelter half, triangle to
rear, flat upon the ground the tent is to occupy, rear man's
f on the right. The halves are then buttoned together. Each
nt man joins his pole, inserts the top in the eyes of the
ves, and holds the pole upright beside the pin placed in the
ound; his rear rank man, using the pin in front, pins down
front corners of the tent on the line of pins, stretching the
vas taut; he then inserts a pin in the eye of the rope and
ves the pin at such distance in front of the pole as to hold
rope taut. Both then go to the rear of the tent; the rear
ık man adjusts the pole and the front rank man drives the
s. The rest of the pins are then driven by both men, the
ır rank man working on the right.

As soon as the tent is pitched each man arranges the contents
the blanket roll in the tent and stands at attention in front of
own half on line with the front guy rope pin.

The guy ropes, to have a uniform slope when the shelter tents
pitched, should all be of the same length.

1859. The guard pitches tents at its post. The cooks' tents
usually pitched at the kitchen.

To Strike Shelter Tents.

1860. The men standing in front of their tents: **Strike tents.**
uipments are removed from the tents; the tents are lowered,
ls made up, equipments slung, and the men stand at atten-
n in the places originally occupied after taking intervals.

To Pitch Heavy Tentage.

1861. The heavy tentage of batteries is usually pitched two lines, the distance between the lines being about 50 feet pyramidal tents. The office tent is pitched in the front line the end next to the line of officers' tents. The first sergeant a the battery clerk are usually assigned to this tent. The tent the rear line in rear of the office tent is assigned to the batt commander's detail, etc. The remaining tents are assigned t to each section. The chiefs of section and the driver squ occupy the front line, the gun squads the second line.

1862. To pitch all types of army tents, except shelter te Mark each line of tents by driving a wall pin at the spot occupied by the right (left) corner of each tent. For pyr tents the interval between adjacent pins should be abo feet, which will give a passage of 2 feet between tents. I tripod is used, spread it on the ground where the center o tent is to be. Spread the tent on the ground to be occup door to the front, and place the right (left) front wall lo over the pin. The door (or doors, if more than one) bei fastened and held together at the bottom, the left (right) corn wall loop is carried to the left (right) as far as it will go a a wall pin driven through it, the pin being placed in the lin with the right (left) corner pins already driven. At the sa time the rear corner wall loops are pulled to the rear and ou ward so that the rear and side walls of the tent are stretch Wall pins are then driven through these loops directly in rea of the corresponding front corner pins, making a rectangle. U less the canvas be wet, a small amount of slack should b allowed before the corner pins are driven. According to the size of the tent, one or two men, crawling under the tent if necessary, fit each pole or ridge or upright into the ring or ridge pole holes, and such accessories as hood, fly, and brace ropes ar adjusted. If a tripod be used an additional man will go under the tent to adjust it. The tent, steadied by the remaining men

at each corner guy rope, will then be raised. If the tent is
:he ward or storage type, corner poles will now be placed at
four corners. The four corner guy ropes are then placed
r the lower notches of the large pins driven in prolongation
he diagonals at such distance as to hold the walls and ends
:he tent vertical and smooth when the guy ropes are drawn
t. A wall pin is then driven through each remaining wall
) and a large pin for each guy rope is driven in line with the
ner guy pins already driven. The guy ropes of the tent are
ced over the lower notches, while the guy ropes of the fly
: placed over the upper notches, and are then drawn taut.
ace ropes, when used, are then secured to stakes or pins suit-
ly placed.

To Strike Heavy Tentage.

1863. **Strike tents.**—The men first remove all pins except
ıse of the four corner guy ropes. The pins are neatly piled
placed in their receptacle.
)ne man holds each guy and when the ground is clear the
ıt is lowered, and folded or rolled and tied, the poles or tripod
l poles fastened together, and the remaining pins collected.

To Fold Tents.

1864. **Common, wall, hospital, and storage tents.**—Spread the
ıt flat on the ground, folded at the ridge so that bottoms of
le walls are even, ends of tent forming triangles to the right
d left; fold the triangular ends of the tent in toward the
ddle, making it rectangular in shape; fold the top over about
nches; fold the tent in two by carrying the top fold over clear
the foot; fold again in two from the top to the foot; throw
guys on tent except the second from each end; fold the ends
so as to cover about two-thirds of the second widths of
nvas; fold the left end over to meet the turned-in edge of the
:ht end, then fold the right end over the top, completing the
ndle; tie with the two exposed guys.

Pyramidal tent.—The tent is thrown toward the rear and the back wall and roof canvas pulled out smooth. This may be most easily accomplished by leaving the rear-corner wall pins in the ground with the wall loops attached, one man at each rear-corner guy, and one holding the square iron in a perpendicular position and pulling the canvas to its limit away from the former front of the tent. This leaves the three remaining sides of the tent on top of the rear side, with the door side in the middle.

Now carry the right-front corner over and lay it on the left-rear corner. Pull all canvas smooth, throw guys toward square iron, and pull bottom edges even. Then take the right-front corner and return to the right, covering the right-rear corner. This folds the right side of the tent on itself, with the crease in the middle and under the front side of the tent.

Next carry the left-front corner to the right and back as described above; this when completed will leave the front and rear sides of the tent lying smooth and flat and the two side walls folded inward, each on itself.

Place the hood in the square iron which has been forced downward toward the bottom of the tent, and continue to fold around the square iron as a core, pressing all folds down flat and smooth and parallel with the bottom of the tent. If each fold is compactly made and the canvas kept smooth, the last fold will exactly cover the lower edge of the canvas. Lay all exposed guys along the folded canvas except the two on the center width, which should be pulled out and away from bottom edge to their extreme length for tying. Now, beginning at one end, fold toward the center on the first seam (that joining the first and second widths) and fold again toward the center so that the already folded canvas will come to within about 3 inches of the middle width. Then fold over to the opposite edge of middle width of canvas. Then begin folding from opposite end, folding the first width in half; then, making a second fold to come within about 4 or 5 inches of that al-

ady folded, turn this fold entirely over that already folded. ake the exposed guys and draw them taut across each other, rn bundle over on the under guy. cross guys on top of bundle, awing tight. Turn bundle over on the crossed guys and tie ngthwise.

When properly tied and pressed together this will make a ackage 11 by 23 by 34 inches, requiring about 8,853 cubic ches to store or pack.

Stencil the organization designation on the lower half of the iddle width of canvas in the back wall.

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